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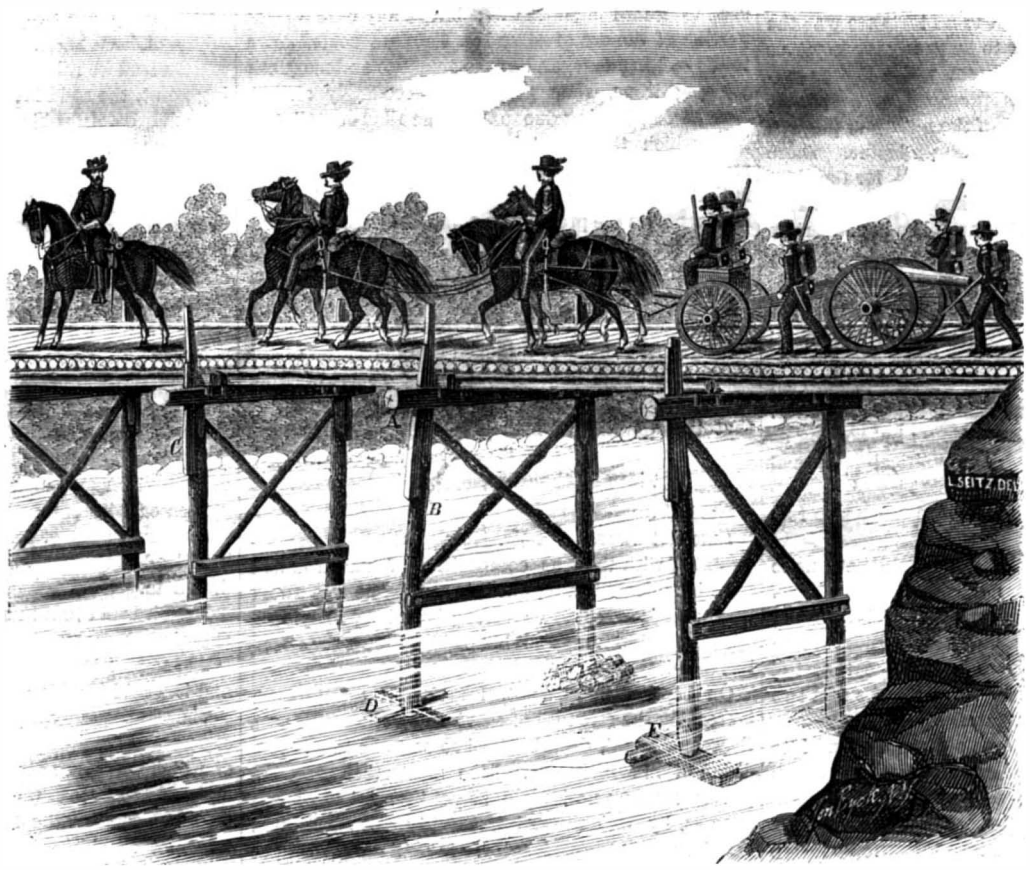
Improved System for Trestle Bridges.

The transit of streams in military operations is often one of the most embarrassing incidents of a campaign. Where the channel can be forded no delay usually occurs, yet even then when the banks are precipitous, or the approaches marshy, some means must be provided for the safe passage of artillery trains and wagons. During the whole of the present war, and up to the ignominious flight of the rebel leaders from their capital, bridges have always been destroyed where practicable, and no means have been left unessayed to detain pursuit by the destruction of them. If time permitted and materials were at hand, a structure might be made for the service required, but when pursuit is hot, and an enemy follows vengefully behind, there is but little time to construct even, setting aside planning, a suitable structure. In such an emergency the bridge here shown will prove a most valuable acquisition, for with the aid of a chisel and an axe, the trestles and floor timbers can be got out most speedily, and the several parts put together rapidly and substantially. The following description will render its construction plain to every one.



DERROM'S SYSTEM FOR TRESTLE BRIDGES.

The floor is supported by the beams, A. These are mortised and fitted over the uprights or stanchions, B, the latter being hewed square on the top side. A key, C, driven from below, serves to sustain the weight of the floor and superincumbent burdens, and also to bind the whole firmly together. Cross braces are then inserted in notches in the stanchions, and the trestles are complete. The bridge is ballasted against lateral disturbance by stones piled against the bases of the stanchions, and the radial arms, D, serve to prevent the stones from scattering. An uneven bottom is made fair by placing a hewed timber on the ground, and any minor exigencies that may arise are easily provided for in a similar way. The bridge is one of the simplest and strongest for a temporary structure we have ever seen. Its principle can be adopted for scaffolds used in erecting buildings, and the saving of time, nails and material generally, should induce builders and capitalists to examine it. No charge is made for the use of it by the Government in whose interest it has already been successfully used. At the time when Suffolk, Va., was besieged by General Longstreet, one of these bridges was thrown over a wide stream having marshy approaches, in a few hours. Another one was also thrown across the Passaic river rapids, below the Passaic Falls, near Paterson, N. J., where it was temporarily left. Col. Andrew Derrom, of the 25th Regiment New Jersey Volunteer Infantry, is the inventor of this system of bridges, and a patent is now pending on it through the Scientific American Patent Agency. For further information and for rights to use this system for bridges or other purposes, address Col. A. Derrom, at Paterson, N. J.

South American Jerked Beef.

Jerked beef, or beef dried in the air, is being largely exported to England, where it is consumed by the poorer classes; it being sold at 6 to 10 cents per pound, or three pence, English money. It is not very delicate food, being tough and stringy, but is said to be better than going without meat altogether.

Captain Basil Hall, in his "Journal in Chili, Peru, and Mexico," gives a very detailed and interesting account of the ox-slaughtering in those countries, and describes the mode in which the jerked beef is prepared. The three men (he says) who had been employed in cutting up the bullocks now commenced an operation peculiar, I believe, to South America—namely, the preparation of what is called by us jerked beef, a term probably derived from the local name *charque*. The men seated themselves on low stools in the different cells, and began cutting off the detached portions of meat into long strips, or ribands, uniform in size from end to end; some of these, which were cut from the larger pieces, being several yards in length, and about two inches in width. To perform this operation requires considerable expertness. The piece of meat is held in the left hand, and at each slice is hitched round, so as to offer a new place to the knife, and in this way the strip of meat seems to unwind itself like a broad tape from a ball, till at last nothing remains. We tried to perform this ourselves, but continually cut the strip across before it had attained any length. When the whole had been treated in this manner it is allowed to hang under cover for a certain time, during which it acquires a black color, and owing to the heat and dryness of the air speedily loses much of its moisture. The meat is afterwards exposed to the sun till throughly dried, and being then made up into great bales, strongly tied around with a net work of thongs, becomes the jerked beef of commerce.

The Use of Soda in Boiler Incrustations.

As the character of the incrustations which are deposited in steam boilers varies greatly with the locality, it follows that no one substance can be recommended as a specific for all cases. In an article on the preservation of steam boilers, the London *Mechanics' Magazine* mentions, incidentally, a case where soda was used with good effect:—

"But incrustation is sometimes formed under peculiar circumstances and cannot be entirely removed by the blowing-out apparatus alone. In general a small quantity of carbonate of soda introduced into the boiler is found to have a very wholesome effect, but soda should only be used in boilers provided with a scum-pipe, as otherwise the soda, combining with the grease in the boiler, produces foaming in the water, which leads to priming. We have previously stated our views with regard to 'boiler compounds,' and we find the general testimony to be against them. As a rule they are found to be expensive, some useless, and others injurious. It would, however, be unfair to close the question with such a general sweeping condemnation, when exceptions do here and there crop out. But these exceptions are very rare, and only become such by the compound being used in cases to which it is specially applicable, and not as an indiscriminate remedy for corrosion.

"One instance of the efficacy of a boiler compound which has come under our notice is that of the boilers at the Phenix Iron Works, Manchester, belonging to Messrs. Elce. The water used is drawn from the Ashton canal and is strongly acidulated, giving much trouble. After several months' use of a boiler compound (Wood & Hall's) it is stated that a very successful result ensued. One of the principial ingredients in this compound is a strong caustic alkali, which converts the acid in the water to a sulphate of soda, the lime, from which the acid has been liberated, falling as a powder to the bottom of the boiler to be blown out, or being carried off by the scum-pipe or other means. There are a few other compounds well spoken of, but in any case the utmost caution should be observed in their use."

We learn that the iron-clad *Dictator*, having completed some alterations, is nearly ready for a trial trip.

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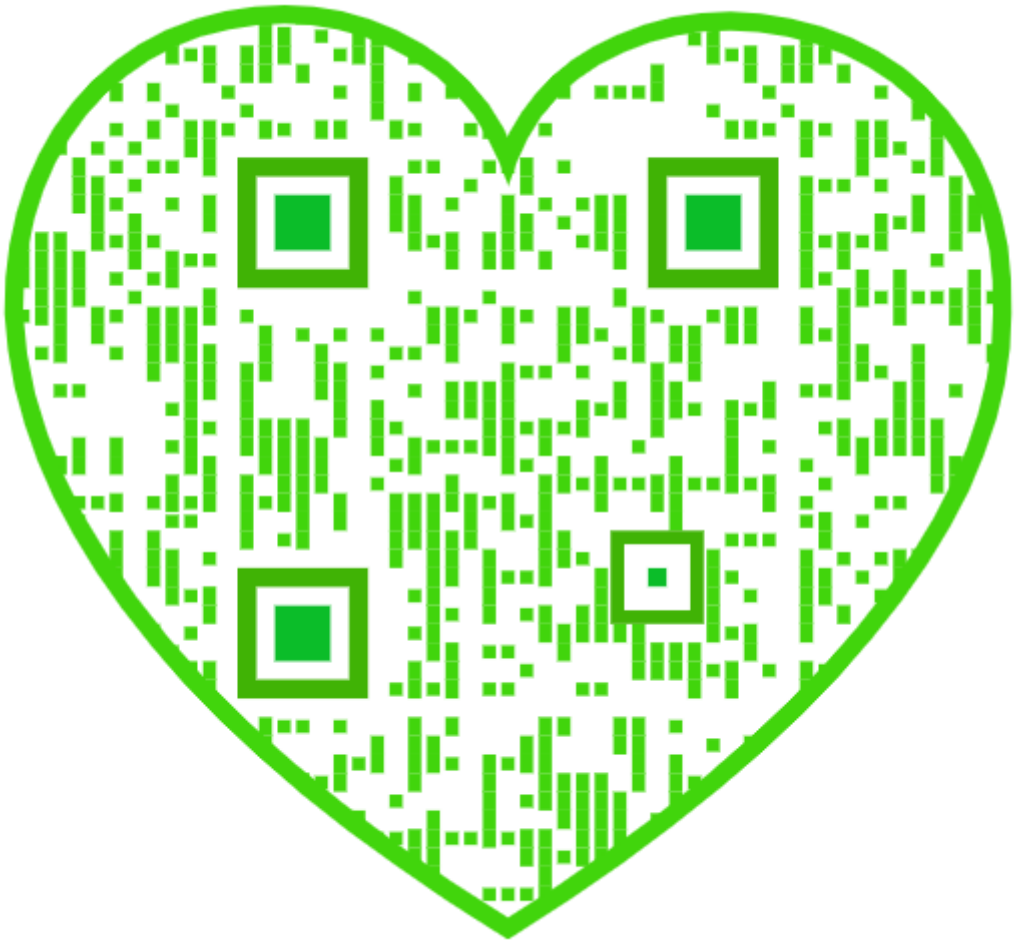

MUSHET ON CAST IRON.

We find the following letter in the London *Engineer:*—

SIR :—In your article last week on cast-iron ordnance are some remarks on the nature of cast iron, and the means of improving that substance for purposes where tenacity and great strength are essential, and you suggest that such an improvement may be effected by partially decarbonizing pig iron in a Bessemer converter.

In the years 1846-1847 I made a series of experiments on this subject with a Bessemer converter, operating upon various brands of pig iron. The irons I employed were of the following kinds of gray, No. 1 quality:—Cleator hematite, Workington hematite, Barrow hematite, Tow Law gray pig, Cinderford, and Parkend. Victoria, Nos. 1, 2, 3 and 4 pig irons:—Blanavon, Pontypool. Russell's Hall and Westphalian gray pig.

The melted pig iron was blown in the converter until it had thrown off the frothy silicious slag which is eliminated during the first stage of the pneumatic process.

The gray iron thus deprived of its silicium, and some of its carbon, was cast into ingots of about 4 in. square. The fracture of these showed a very uniform grain of gray cast iron, the grains being small, and the texture very compact, but in no instance was the strength of the iron found to be nearly so great as that of the original pig iron from which it was prepared. These results I was prepared to anticipate from my previous knowledge of the nature of pig iron and of the cause to which its strength is due. There is no difficulty in thus treating cast iron, for the sides of the converter are not attacked by the silicious slag, and the operation can be carried on in converters of small size, which can be charged twice in an hour, and kept going night and day if required.

The iron thus operated upon is exceedingly fluid and lively, and can be run into the finest moldings; but the castings thus made are weak and brittle. Nothing in the way of improving the strength of cast iron can be expected from thus operating upon it. The reasons are, to me, quite obvious; but so long as the public are shackled by the empirical dogmas of chemists respecting the nature of cast iron, the matter must be more or less obscure to those who rely upon these dogmas.

Cast iron is not what chemists would have us to believe it to be, namely, a carburet or carbide of iron. Gray cast iron is an alloy of carburet of iron, steel, and malleable iron, with a mechanical mixture of graphite; white cast iron is an alloy of carburet of iron, steel and malleable iron, in which the first two substances largely predominate.

In the blast furnace the ores of iron descend into the zone of fusion in various conditions. These conditions are the following:—

1st. Iron ore partially deoxydized, but not yet metallized. When this comes into the zone of fusion it is reduced to a black slag, and none of it is metallized; when an excess of ore comes down in this state the blast furnace cinder is black, the iron white, and the furnace scours.

2ndly. Iron ore fully, deoxydized, but only in the nascent state of metallic iron.

3rdly. Iron ore completely deoxydized but not carbonized. This is in the state of malleable iron.

4thly. Iron ore deoxydized, metallized and carbonized so as to be in the state of crude steel.

5thly. Iron ore deoxydized and carbonized, so as to constitute carburet of iron.

6thly. Iron ore deoxydized and carbonized, so as to contain graphite mechanically mixed with it. When the bulk of the ore coming down into the zone of fusion is of this class the pig iron produced is very rich in carbon. Such is the Scotch pig iron, in which, from the nature of the black band ironstones, the iron and carbon of which are intimately mixed, and from the hight and size of the blast furnaces, the ore is almost wholly brought into the gray carbonized condition before it reaches the melting zone.

Iron ores, therefore, when passing through the blast furnace, are deoxydized and carbonized so as to form six distinct classes of material, when they descend into the melting zone of the blast furnace. The proportionate quantities of each class will depend upon the nature of the fuel, the nature of the blast (whether hot or cold), the weight and capacity of the furnace, and the nature and composition of the ores themselves, and the fluxes with which they are smelted.

The strength of cast iron depends almost wholly upon the quantity of malleable iron it contains; and therefore, when in any blast furnace a large portion of the ore, class No. 3 comes down to the melting zone, the pig iron produced will be proportionately strong. On the other hand, when classes No. 4 and 5 predominate, the pig iron is white and brittle, for crude steel and carburet of iron are brittle, as is also any mixture of these substances. When class No. 6 predominates the iron is gray, such as Scotch pig iron; but it is brittle, containing but little malleable iron. It is not, however, so brittle as white pig iron, because its texture is granular and not crystalline.

The effect of silica in the blast furnace is to retard or prevent the carbonization of the iron ore. Therefore, pure silicious iron ores, such as hematites and magnetic ores, when they come down to the zone of fusion, are more or less largely in the condition of class No. 3, and in small cold blast furnaces almost wholly so. Therefore rich silicious hematites and magnetic iron ores, smelted in small cold blast furnaces, have a strong tendency to fill the hearth with malleable iron, unless an excessive quantity of fuel is used to guard against this; but in any case a large portion of the ore of class No. 3 always comes down to the melting zone, and hence hematite and magnetic ore pig irons, when gray, are exceedingly strong, their strength being due to the large alloy of malleable iron which they contain. Gray pig iron is often rendered stronger by re-melting, and the cause of this is that the loss of carbon which takes place in melting increases the proportion of the malleable iron present in the alloy.

By partially decarbonizing cast iron in the Bessemer converter its strength is diminished for the following reason :—The malleable iron present being highly combustible is at once attacked by the oxygen of the blast, before the less combustible carburet of iron, steel, or gray carbonized iron is at all acted upon; so that the quantity of malleable iron which imparts strength to the cast iron is reduced, and the strength of the cast iron is, therefore, proportionately reduced also.

I am not aware that Mr. Morries Stirling was acquainted with the true composition of cast iron as I have here described it; but it is certain he was aware that cast iron could be strengthened by alloying it with malleable iron, and hence his patents for effecting that improvement.

On September 3d, 1863, I took out a patent for increasing the strength of cast iron by alloying it with Bessemer metal, decarbonized so as to be in the condition of malleable iron. Like most other great improvements, no notice has as yet been taken of this process, by which in all probability the strength of cast iron may be quadrupled. Inventions relating to iron and steel appear to require a probation of a series of years before the public are able to recognize their efficiency and importance. Thus the hot blast patent was scarcely named for the first ten years of its term. My own spiegeleisen patent, on which hangs the very existence of the Bessemer process in this country, was put aside for six years. The rotary puddling furnace is only now beginning to attract proper attention, after remaining for years in abeyance.

Of my process for strengthening cast iron, which has been now nearly two years before the public, I have heard nothing, except the opinion of a leading ironmaster, to the effect that my process was not worth a trial. Opinions such as these, confidently given by men who have never devoted a moment's thought to the subject they speak of, tend more than anything else to retard the progress of improvements in iron metallurgy. When my spiegeleisen patent was taken out, eight years ago, it was pronounced to be of no value, and a mere theoretical bagatelle. Yet this bagatelle is yielding Mr. Bessemer over £100,000, and his present licenses probably one million sterling, per annum, and a few years will see these returns increased probably tenfold. R. MUSHET.

Belgrave House, Cheltenham, April 18, 1865.

MACHINES for seeding currants and stoning raisins are in common use in England.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening April 27, 1865, the President, S. D. Tillman, Esq., in the chair.

METALS—SOLID AND MELTED.

Dr. Rowell gave an account of some experiments which he had made to test the relative specific gravity of solid and molten lead. He took a hydrometer tube, which is a glass tube with two bulbs blown in it, a small one at the bottom and a larger one above, and introducing a small quantity of lead he melted the metal with an alchohol lamp. The quantity of lead was sufficient to fill the lower bulb and half the upper bulb. Dr. Rowell supposed that if the metal shrank in hardening it would draw the two bulbs together and break the glass at the neck, while if it expanded it would burst the lower bulb. The glass was not broken; he, therefore, concluded that lead in hardening neither expands nor contracts, at all events not more than glass.

Another experiment resulted in the same conclusion. Having a kettle with a hemispherical bottom he filled it with molten lead and allowed it to cool. He then melted it all except a little lump at the center of the surface, and observed that the upper part of this lump was precisely at the level of the surface of the molten mass. But if the temperature of the molten lead be raised a few degrees above the melting point, the solid lump sinks; lead, whether molten or solid, being subject to the law of expansion like other bodies.

The case is different with iron. Visiting an iron foundery a few days before, he took the opportunity to drop a small ball of nearly red hot cast-iron into a ladle of the molten metal, and the ball floated with about one-tenth of its mass above the surface. One of the workmen dropped a leaden bullet into the ladle, when it went to the bottom instantly.

Mr. Blanchard said that he had tried the experiment of throwing solid cast-iron into molten cast-iron a thousand times, and it will always float.

Mr. Norman Wiard observed that there was some deception practiced in relation to the lead bullet; as every foundery man knows that if lead be mixed with molten cast-iron an explosion follows. The iron may all be thrown out of a ladle at any time by placing a little lead in the bottom of the ladle before the iron is drawn in.

Mr. Bird said that in melting lead he had tried the experiment many times of pushing with a stick a solid lump of lead to the bottom of a molten mass, and it would invariably rise again to the surface.

The Chairman explained that he was present at the experiments made by Professor Everett, an account of which was given at the time, and it was found that a pig of solid lead would sink in a kettle of molten lead, but whether the temperature of the molten lead was not considerably above the melting point, was not carefully observed. Had the solid and the molten lead been of about the same temperature perhaps the result would have been different.

Mr. Garvey remarked that the fact of the solid floating upon the molten metal was not conclusive proof of a lower specific gravity, as there were mysteries connected with the behavior of the substances under these conditions that had not yet been unraveled.

Dr. Parmelee observed that water, sulphur and some other substances when they change from the solid to the liquid state crystalize, and the crystals arrange themselves in such way as to have interstices between them, in this way diminishing the specific gravity of the substances. But substances which have not this property, increase their specific gravity in passing from the solid to the liquid state. If the experiment be properly and fairly tried it will be found that solid lead or iron will always sink in the same metal melted.

THE VANDERBILT MEDAL.

Mr. Norman Wiard presented the designs and plaster casts of the gold medal voted by Congress to Commodore Vanderbilt in recognition of his munificent gift of his superb steamship, the *Vanderbilt*, to the nation in her hour of need. The design was by Leutze and the medal is being executed by Mr. Salathiel Ellis. On one side is a likeness of the Commo-

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dore in bas relief, and on the other an allegorical design; a female figure representing commerce is kneeling to another meant for America, standing upright, with a huge two-handed sword on her shoulder, and with her left hand resting upon a shield, while the back ground is filled with the spars and hull of the great ship. The medal will be three inches in diameter, and will cost $3,000. The ship is of 5,000 tuns burden; she was built in the most thorough and careful manner, and cost $800,000.

DECOMPOSITION OF OXYGEN.

The President read an extract from a foreign paper stating that Schonbein had succeeded in decomposing oxygen, but expressed doubt in regard to the truth of the statement.

INJURY TO CLOTH FROM SILICATE OF SODA.

The President also read a statement that Mr. Calvert, of England, had been examining some damaged cotton cloth, and had come to the conclusion that it was injured by the silicate of soda employed in finishing it. The conclusion seemed to be that the crystals formed from the silicate used in connection with lead had broken the fiber of the cotton.

PRODUCTION OF HEAT IN STRETCHING INDIA-RUBBER.

The effect of stretching on the temperature of wire being spoken of,

Dr. Parmelee called attention to the fact that india-rubber is heated by being stretched, and if held a moment to allow the heat to radiate, and then suffered to contract, it is very perceptibly cooled. By frequent repetition of the process the temperature may be lowered a great many degrees. Dr. Parmelee supposed that he was the first to observe this curious phenomenon. His theory to account for it is, that in stretching the india-rubber is in fact condensed, the fibers being drawn together somewhat as the strands of a net are when it is stretched.

MANUFACTURE OF INDIA-RUBBER COMBS.

Mr. Parmelee, being called upon to open the regular subject of the evening, the manufacture of combs, remarked that he had designed to speak only of combs made from hard rubber. Exhibiting a black mass, he said that it was a specimen of the rubber after being masticated—that is, passed between hot rollers one of which revolves a little more rapidly than the other, and thus grinds and kneads the substance into a homogeneous mass. He then exhibited a specimen of the rubber after being mixed with the sulphur. It was a light colored, limber, elastic sheet. The speaker remarked that hard rubber differs from soft vulcanized rubber only in containing a larger proportion of sulphur, and being subjected to a higher temperature and for a longer period. It was invented by a younger brother of Mr. Charles Goodyear, the author of the great discovery of vulcanized rubber. The materials are mixed in various proportions, ranging from 4 to 16 ounces of sulphur to the pound of rubber. The best proportion is that of equal parts of sulphur and rubber. After the two ingredients are thoroughly incorporated the sheets are rolled down to about one-sixteenth of an inch in thickness, and are then subject to a temperature of 280° for 8 hours. In order to keep the surfaces of the sheets smooth they are oiled on both sides with a solution of lard in petroleum, and covered with a very thin sheet of block tin. They are then placed either in a pan of water or in a tight soapstone box, and enclosed in a strong air-tight cylinder, where they are heated to the required temperature.

The speaker stated that hard rubber may be softened by immersing it in boiling water, or otherwise raising its temperature to 212°. It can then be stamped, pressed, or molded into any desired form. Combs are made by pressing the substance into the proper form, while it is thus softened, and then cutting the teeth. There are three processes for cutting the teeth. By one process each tooth is cut separately by a circular saw. A small machine has been invented by which the comb is fed to the saw, drawn back automatically and carried forward to the next tooth, till the comb is completed, when the feed motion stops, and the machine gives notice by sounding an alarm.

The machines are ranged in a row, and one girl can attend some 20 of them. By another process, a piece of hard rubber is pressed into the proper form for two combs with the backs at the two edges, and then the teeth are all formed at a single stroke of a press, each tooth of one comb coming from out the space between two teeth of the other comb. The third process is employed in cutting the finest teeth. A very thin blade of steel has a rapid reciprocating vertical motion, over an anvil of block tin, and the comb to be cut is fed along horizontally under the cutter, one tooth being formed at each stroke. In this operation the rubber is kept warm, and no material is cut out, the tooth being formed by pushing aside a portion of the substance.

After the teeth are cut the combs are polished by hand, the work being done mostly by girls. The combs are first ground upon a stone, and the polishing is finished upon a buffer of cotton and oil. They are then packed and sent to market. The business is large, and great fortunes have been made from the manufacture.

An Inventor Buried under Twenty Tuns of Iron.

John Wilkinson, an eccentric English inventor, was the inventor also of the art of boring cannon and cylinders, and contracted for, and supplied, all the iron pipes for the celebrated Paris Water Works. He was a most eccentric man. In his will he ordered at his death that his body should be buried in his own garden grounds at Castlehead; where for many years he had kept a large iron coffin to be ready. It stood amongst the laurel trees near the house, along with many other smaller ones, which he took a delight in showing to and offering to his friends gratis, to their utter horror and dismay. When he died (about 1807) his body was brought to Castlehead, according to his own request, but owing to the length and bulk of the lead and wood coffins in which he was encased, the iron coffin which he had so long kept for the purpose was found to be too small, and in consequence, his body was temporarily deposited in the garden walk till such time as a much larger iron coffin could be made at the Works in Wales and sent to Castlehead. When the new coffin at length arrived, the body was disinterred and placed therein, and again buried in the grave originally intended for it. Here it remained a short time, but as the size of the coffin was very great it stood up above the ground and looked unsightly, so that it was thought desirable to take it up again and sink the grave about three feet into the solid rock, which accordingly was done, when it was again buried, and over the grave was erected a pyramidal tomb of iron, in one piece, twenty tuns in weight, with a medallion containing an excellent likeness of the deceased, and the following inscription, written by himself:—

"Delivered from Persecution, Malice and Envy, here rests John Wilkinson, Iron Master,

In certain hopes of a better state and heavenly mansion, as promulgated by Jesus Christ, in whose gospel he was a firm believer. His life was spent in action for the benefit of man, and he trusts in some degree to the glory of God."

Within the last two months the mausoleum has been broken up and sold for old iron.

New English Nursing Chair.

This invention, is a chair or other seat combined with receptacles in such manner that a person seated thereon may open and close the receptacles and place articles therein, or withdraw them therefrom without rising or removing from his seat. The receptacles are fixed in a chamber or frame attached to the framework of the chair below the seat in the space usually left vacant between the legs. They are divided into compartments, and preferably closed by spring fastenings. The chair may be adapted with great advantage as a nursery chair, being in that case fitted with arrangements for receiving the clothes and various articles required in tending infants, so as to avoid the necessity of the nurse or mother rising and leaving the children in order to get the desired wardrobes from somewhere else. This article is patent in England.

How to Raise Mushrooms.

The *Irish Agricultural Review* gives the following instructions for raising mushrooms:—

The usual width for a bed of this description is five feet at bottom, four feet high, sloping from either side, and ending in the form of a ridge or roof of a house. As soon as the foundation is laid to your satisfaction, the remainder ought to be stacked up, as it were, and firmly beaten down, so as to make it somewhat solid, by the aid of a three-pronged fork, as the final result mainly depends upon its solidity. Small sticks should then be placed in it at intervals, and examined daily, for the purpose of ascertaining the heat, which when mild is ready for work, and then the spawn may be freely inserted or planted. The heat is merely requisite to incite or start the spawn, and, therefore, it is not necessary that it should be very great. Some beds, after making up, will need a fortnight for the heat to diminish or subside; but, as a rule, when it averages 45 deg. or 50 deg., the spawn may with safty be inserted. As soon as the spawn is planted, the bed or beds must be earthed up with a three-inch thickness of good soil, which, after being pressed down smooth with a spade, should be covered with at least eight inches of dry straw.

Area of Roofing to Supply Tanks of Given Dimensions with Rain Water.

Our rain fall averages 25 inches per annum, being rather more than two cubical feet for every square foot of horizontal surfaces employed in catching it; or, say, 200 cubical feet of water to the square. Each foot contains 6¼ gallons bf water. A tank, 15 ft.× 9 ft.×7½ ft., will hold 6,581 gallons, and about 5¼ squares of horizontal surface would catch enough rain water to fill it in the year at the above rate of rainfall. In estimating the area of roof, the level area only must be calculated and not the surface area, which is often half as much again. Hence the simple method is to take the area of ground plan and double the number of feet contained in it, which will give the amount in cubical feet of water that, on the average, may be collected in each year.

Detection of Fires in Ships.

An exhibition of a very interesting character was made on the 6th of April, at Blackwall, England, the object being to indicate and announce the presence of fire. An indicator, with an alarm bell, was placed in a part of the building supposed to represent the Captain's cabin, connected with a battery, with wires leading to the calormetres fixed in the hole and other parts of the vessel. Some of these wires also led to the water apparatus placed in the well of the ship. The first experiment was made by increasing the water in the hold, and immediately upon its rising a few inches the alarm bell was rung, and the indicator showed that the cause of the alarm was from "water;" the continual increase of water caused the indicator again to show "water two feet." The second experiment was made upon some jute which was supposed to be in the hold and in the act of heating, which, when the temperature rose to only 100 deg., caused the apparatus to ring the alarm in the captain's cabin, while the indicator denoted "Fire – Hold." The heat was generated upon this occasion by pouring a quantity of warm water upon the jute. The other experiments were made from calormeters supposed to be placed in various other parts of the ship, the indicator showing in what part of the vessel the fire was generating; the heat in these cases also being from a tumbler of water heated only to 100 deg., applied to the several calormetres.

To Remove Flies from Rooms.

Now that hot weather approaches, the following method of trapping flies, as practiced and indorsed by a correspondent of the *Irish Agricultural Gazette*, will be found useful:—A hand glass, commonly used by gardeners (a square one is the best), is the instrument to be used. This has to be tightly covered at the bottom with thick white paper. A circular hole, 6½ inches in diameter, is then cut in the center of the paper, and the glass is placed on three bricks over a plate filled with beer, sugar, and a little rum, a moderate distance from the infested spot. The effect is magical; in a few hours the glass is crammed with flies, which, having tasted the sweets, fly upward to the light. A common sulphur match, made by dipping brown paper into melted brimstone, will destroy thousands. The constant hum of insect life will attract all to the glass, and the scent of the rum is sure to induce the most fastidious wasp to enter, as no insect can resist its powerful attraction. This is stated to be effectual in alluring hornets and wasps from fruit trees, though we imagine it would take a large glass to hold all we have seen in some neighborhoods.

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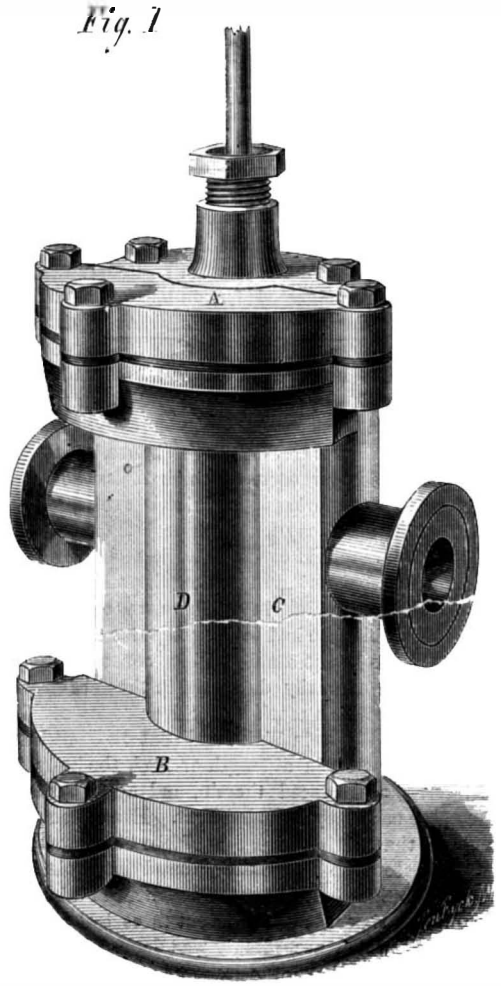
Fire-damp in Collieries.

A beautiful application of that mechanical power which resides on the surface of bodies, and which is especially developed in those having a porous structure, known to us as exosmose and endosmose, has been made by Mr. G. F. Ansell, of her Majesty's Mint. It will be well known to most of our readers that Professor Graham has been engaged for many years in examining all the phenomena connected with the action of porous bodies, organic or inorganic, upon gases or liquids. As the phenomena which Mr. Graham groups under the general term of osmose force may not be familiar to all, a brief explanation may be desirable. If salt and water be placed in a bladder, and this be placed in a vessel containing pure water, the salt will pass out of the bladder into the water. Recently an application of this experiment has been made in Glasgow with much success. In salting meat a large quantity of albuminous fluid flows out of it with the diliquescing salt, and this, a valuable because nutritive portion of the animal matter, is lost. Now, this albuminous brine is placed in a bladder, and this again in a vessel of water; by virtue of osmose force all the salt passes through the animal membrane, and pure albumen, of considerable commercial value, is left behind. If in the place of a membrane of this kind we employ a porous diaphragm of baked clay, of plaster of Paris, or the like, the same action takes place. By this means we may separate bodies from each other which are mechanically mixed, and even in many cases when mechanically combined. Pursuing inquiries of this character, Mr. Ansell has been led to a discovery which promises, above all others, to give us easy methods by which we may determine the presence of carbureted hydrogen in our coal mines, and he has invented a simple apparatus which promises to indicate the accumulation of fire-damp before it becomes and either to give the miner notice of it, or to convey that notice to the surface by its connection with some simple electro-telegraphic arrangement. Mr. Ansell has given two or three forms to his apparatus. The first is that of a thin india-rubber ball, which is filled with ordinary atmospheric air, and is placed on a stand under a lever which slightly presses its upper surface. This lever is connected with a spring, which it liberates when from any cause the lever is raised, and the liberation of the spring sets a bell in vibration. This arrangement being placed in a vessel containing but five per cent of ordinary coal gas exhibits the phenomenon of endosmose with much rapidity. By the passing in of the carbureted hydrogen, the india-rubber ball swells, the lever is of course raised, and the bell is rung. Experiments made with the light carbureted hydrogen gas of the coal mines show that the action is precisely the same in character. This little apparatus, the cost of which will be very trifling, may be placed in any part of a colliery with the certainty of its indicating the presence of fire-damp when yet in small quantities, and before there is any real danger. If the spring of this little instrument be so arranged that it makes or breakes connection with an electrical battery, the signal of accumulating danger may be at once conveyed by wires into the office, or any house on the surface of the colliery, and, either by ringing a bell or moving a magnetic needle, give the necessary warning to the owner or manager. Another form of arrangement assumes the shape of a barometer. A glass tube is bent into the form of a U, and upon one of the arms is fixed either a porous earthenware cell or a slice of graphite. The lower portion of the tube U holds a few inches of mercury. The moment a current of air, mixed with either heavy or light carbureted hydrogen gas, even in small proportions, passes over the graphite diaphragm, or blows against the porous cell, the mercury is depressed in one arm of the tube, and consequently raised in the other. By an arrangement precisely similar to that which is adopted in the wheel barometer, an index may be moved over a dial, and made thus to indicate with accuracy the appearance of dangerous gas in a colliery, and register its accumulation. It is not often that a more refined application of a scientific discovery than this has been made, while the arrangements, which have been patented by the inventor (Mr. G. F. Ansell), are so simple that they may be placed with confidence in the hands of any man to whom a safety lamp would be intrusted. As an unfailing indicator of the presence of the collier's deadly enemy—fire-damp—we cannot but regard this invention as one of the highest value.—*London Engineer.*

SMITH'S LIFT AND FORCE PUMP.

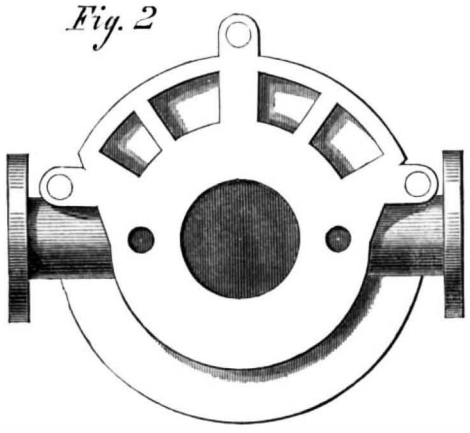
It is well known to mechanics, or other persons using pumps, that they are frequently inoperative from derangement of the valves. It is a simple matter to inspect these when accessible, but very many

Fig. 1



manufacturers seem to take special pains to put them in the most inconvenient and difficult positions; as also to fasten the bonnets, covering them with innumerable bolts, so that it is an hour's work to break the joints.

Fig. 2



These engravings represent a simple lift and force pump, which is conveniently arranged with regard to its valves. The bonnets, A and B, cover, respectively, the top and bottom suction and discharge valves, and communicate with the channels, C, and the pump barrel, D, in the usual manner. By merely unscrewing three nuts, the valves can be examined at any time, or renewed with facility when worn out. Fig. 2 represents a plan of the valve seats, which are both alike at the top and bottom. A patent is now pending on this invention through the Scientific American Patent Agency, by T. C. Smith; for further information address him at Chicago, Ill.

THE Bergen tunnel, on the Erie Railroad, which has been the scene of so many accidents, is now lighted with a calcium light.

Purification of Petroleum.

In treating for disinfecting and removing the impurities from petroleum and products thereof, it has been usual to employ chloride of lime in a dry state and in combination with other matters, but which, however, is very imperfect in its action and far from obtaining the desired results. According to an invention which has been patented by Mr. B. Azular, of Rotherhithe, the oils are treated with a saturated solution of chloride of lime, and, as it were, washed in the solution. For this purpose the oil is placed in a suitable vat or vessel and the solution poured over it, the solution sinks through the oil, and is drawn up from the bottom, and by a pump or other means is elevated again to the top, and so a circulation of the solution in the oil is kept up, and the impurities thus abstracted from the oil, which is rendered clean and quite free from offensive smell, besides enhancing its lighting properties. If the oil is not very bad the same solution may be used again. If the oil is bad the solution will be found to have acquired the taint of the oil and must not be used again. If the oil is very bad it may be found necessary to repeat the process with a fresh solution, in that case a second vat is provided, the top of which would reach the oil tap of the first vat; the treated oil is then drawn from the first into the second vat and washed in water. After the oil has been separated from the water, the latter is drawn off and a second solution is then thrown on the oil, and the process proceeds as before. Instead of the solution of chloride of lime being applied at the top and drawn up from the bottom of a vessel, the oil may be forced in at the bottom of a vessel containing the solution of chloride of lime, when it will rise through the solution and may be drawn off at the top, repeating the operation as often as may be necessary according to the quality of the oil operated upon.—*Mechanics' Magazine.*

Death of a Distinguished Naval Officer.

Edwin J. De Haven, a lieutenant in the United States Navy, died at Philadelphia on the 2d inst., in the forty-sixth year of his age. He has been repeatedly noticed for his gallantry and skill, and was also celebrated for his fine scientific attainments. He was attached to the Washington Observatory, and constructed the famous ocean charts for which the rebel Maury received so much credit. He was selected to command the Grinnell Expedition to the North Sea in 1850, and, on his return, was employed in the Survey Department on the Southern coast. In 1857 his eye-sight became so much impaired that he was compelled to retire from active service.

NOTES AND QUERIES.

We are continually in receipt of letters from parties inclosing three cents, accompanied with a request to write them by return mail on the size of boiler flues, where to obtain bolts, and all sorts of miscellaneous information. We are pleased to answer these letters, but not by return mail, and all replies to such correspondence will be found in the "Notes and Queries" column at the back part of each paper.

SPECIAL NOTICE.

GEO. W. OTIS, Lynn, Mass., has petitioned for the extension of a patent granted to him on the 20th day of August, 1851, for an improvement in insulators for lightning rods.

Parties wishing to oppose the above extension must appear and show cause on the 7th day of August next, at 12 o'clock, M., when the petition will be heard.

AT the last sitting of the Academy of Sciences, MM. Engard and Philippon sent in a new hygrometer, formed out of a flat piece of ivory cut out of the tusk perpendicularly of its axis, and then formed into a spiral. The instrument it extremely sensitive, the spiral either being dilated or contracted circularly, but it has not yet been compared with other hygrometers.

IN consequence of the increasing difficulties in the tunneling operations at Mont Cenis, it is now computed that the works cannot be completed within the former estimate of ten years, instead of four or five years. Geologists predict that a stratum of granite will sadly interfere with the progress of the work.

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Common-sense Political Economy.

We find the following in an exchange. The writer displays rare common sense:—It is very common for agricultural writers to lament the decline of domestic manufacturing, and to advise farmers to raise as great a variety of crops as possible, on the assumption that the nearer a family can come to the production, by their own skill and industry, of all they need, the more prosperous and independent it will be. In reply to an article written for the purpose of recommending a return to the good old customs of our fathers in this respect, we find the following off-hand comments in the *Prairie Farmer:*—As "revolutions never go backward," we like the "bright side" view of the writer.

"Now, when I was a boy, fifty years ago, I went through this mill, and know exactly how it grinds, and from such a farmer's life may the good Lord deliver us. My father had a large family, and I do not think his store bill amounted to twenty-five dollars a year.

"We made our own sugar from the maple grove, we grew our own wool and flax, and it was manufactured in the house. The shoemaker and tailor came twice a year and made our shoes and clothes; the girls did the spinning and weaving, made the straw hats, bonnets, etc. By the most diligent industry of every member of the family, young and old, and the most frugal economy, we made a plain, substantial living, and were coarsely but warmly clad. But by doing so many things, we must necessarily do everything on a small scale, and in consequence had very little to sell, and the end of the year found us with very little if any profit. The wealth of men as well communities depends upon the amount they produce more than they consume, and to do this we must have a division of labor. I want to furnish some man that has machinery driven by water or steam with the raw material, and let him do the manufacturing while I feed him. If farmers turn mechanics manufacturers must of necessity turn farmers. I should be sorry to see the day when farmers were obliged again to use the hand-loom in their domestic economy.

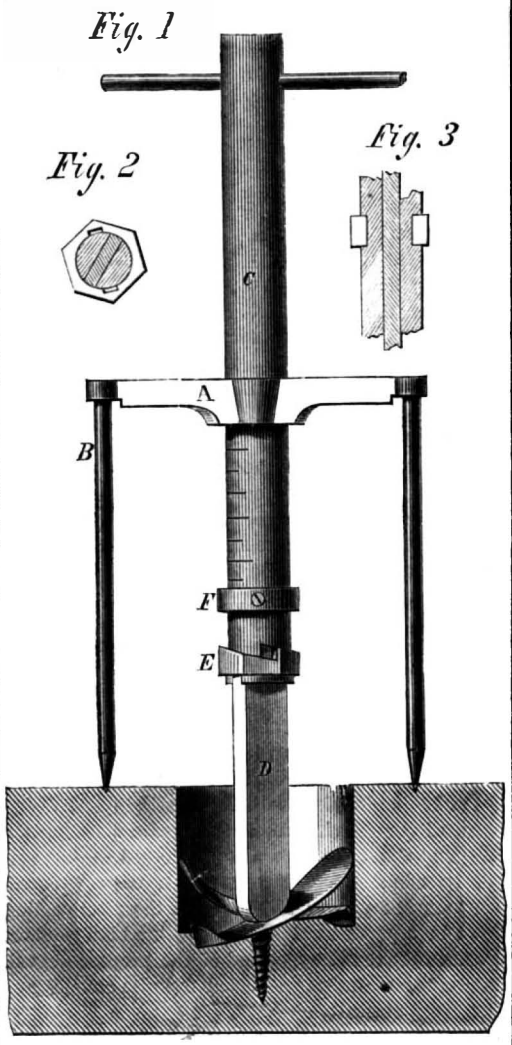
"I can grow a bushel of wheat or a pound of wool much easier than I could make a jack-knife or cambric needle. They are both articles I need, and the man that makes them needs my wheat and wool, and as long as needles and knives are made I have no fear about getting them, provided always that I have the wheat and wool.

"If the broad prairies of Iowa and Illinois were not calculated for grazing and woolgrowing on a large scale, I cannot understand what they were intended for. If every farmer pursued the course suggested you would have no such city as Chicago, and very little use for your magnificent network of railroads."

GILLETTE'S IMPROVED AUGER.

Boring holes with ordinary augers or bits is not a very satisfactory performance, for after going a certain depth the chips jam in the twists, causing a great deal of labor to overcome the resistance caused thereby, and frequently heating the cutting edges so that the temper is drawn; besides this, time is wasted in raising the tool so as to clear the hole out and complete the work. For want of a guide, also, the operator has no way of determining whether the tool is going straight or not, and holes are often bored untrue from this cause.

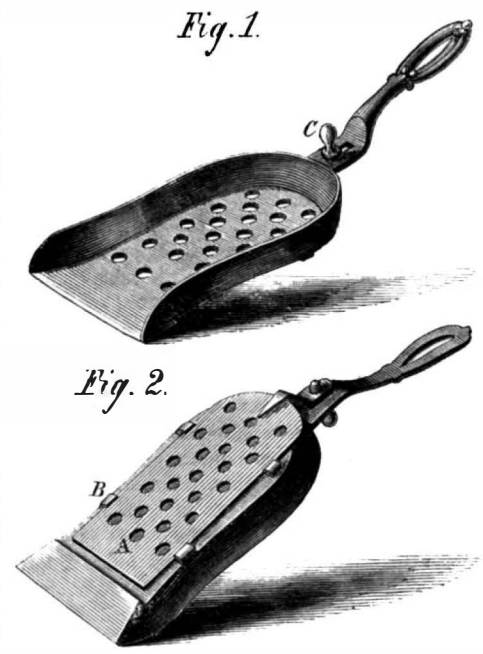
The object of the improvements illustrated in this connection, is to provide means for boring holes perfectly true and to relieve the unnecessary friction caused by carrying the chips around. To attain these objects, the inventor provides a guide, consisting of a bar, A, supported by legs, B; this bar carries the shaft, C, in the end of which the bit, D, is fitted. This bit is merely a straight flat bar, notched on one end where it fits in the shank, and armed on the cutting end with blades, which act as the common auger does. On the auger shaft there is a sleeve, E, which has stops, so that it cannot be turned too far. When in the right position, that is, so that the slots in it coincide with one in the auger shaft, Fig. 2, the tool can be inserted, and by turning the sleeve, E, held firmly in place; the top of said bit being held by another sleeve, F. Figure 3 shows the adjustment of the sleeve on the shaft so that it cannot slip. By making a graduated scale on the auger shaft, a hole can be bored to any depth without removing the auger until the work is done to try the distance. This tool will cut remarkably free, easy and true, and is desirable in framing houses, ship-building, or any



place where similar tools are used. It was patented on March 14, 1865, through the Scientific American Patent Agency, by E. C. Gillette, a resident of San Francisco, Cal. For further information address Henry Lyon, 119 Nassau street, New York.

SCHAAP'S FIRE SHOVEL AND SIFTER.

This utensil is designed to be employed as a shovel or scoop, and, on occasion, to sift ashes to extract the



cinders therefrom, so that they may be again used for fuel. Scoops with perforated bottoms are not new, but the manner of constructing the one here shown is novel and ingenious. With common perforated scoops, the contents are apt to fall through in the act of carrying them from the stove to the ash box; live coals also drop out, and damage the rug or carpet if they fall upon it. This scoop is made with a sliding bottom, A, which is retained in place by clasps, B; in the handle of the scoop is a slot through which a knob, C, projects, said knob being fastened to the plate below. When this knob is pushed down, as in Fig. 1, the holes in the scoop and plate coincide, so that it may be used as a sifter; but when the plate is reversed the holes, are closed and the bottom is solid, allowing nothing to fall through. This invention was patented March 21, 1865, through the Scientific American Patent Agency. The patent is for sale; orders for shovels supplied. For further information address the patentee, Richard Schaap, Jr., 128 Myrtle avenue, Brooklyn, N. Y.

MISCELLANEOUS SUMMARY.

The Hardening of Hydraulic Cement.—Dr. Feichtinger, in a paper "On Winker's Theory of the Hardening of Portland Cement," states his opinion that the hardening results from the formation of chemical compound of lime and silica, or lime and a silicate. In all hydraulic limes, he states, free lime is contained. He has already shown that, when Portland cement is made up with a strong solution of carbonate of ammonia, no hardening takes place, even when the excess of ammonia is washed out, in consequence of the lime becoming converted into carbonate; but if some hydrate of lime is added, the cement hardens, as well as fresh cement.

Bell Music for Paris.—The tower of the church of St. Germain L'Auxerroix is about to receive a very perfect chime, consisting of no less than forty bells, which will play twice every day; and the machinery setting them in motion is so arranged that any number of tunes may be played upon them. The well-known mechanician, Collin, has constructed a gas engine, in which the air is condensed to twenty-one atmospheres, and thus sets in motion a number of small cylinders, which act upon the bells, on the musical-box principle. M. Collin is engaged upon a series of experiments in which elasticity forms the motive power.—*Builder.*

Oil Tank with a Water Bottom.—A Cincinnatian, now in the Venango oil regions, is stated to have become short of barrels to secure the fluid. His ingenuity was set to work, and he immediately put a bottomless tank into the water and directed the stream from his flowing well into it. The lighter quality of the oil kept it above the water, and when the receptacle became filled the enterprising miner cut loose his moorings and floated down the river to the refinery.

The funeral procession of Abraham Lincoln in the length of its passage, in the number of mourners, in solemnity, depth and extent of grief, surpassed all that had preceded it. The one that came nearest to it in previous history was that of Alexander the Great, whose body was borne on a golden chariot from Babylon in Asia to Alexandria in Egypt.

Reduction in Coal.—The coal trade is unusually depressed, and owners find it impossible to effect sales at present high prices. A large reduction has therefore taken place in wholesale prices, which will or ought to cause a reduction of two dollars a tun to consumers, with a prospect of a further decline soon.

The Wheeler & Wilson Sewing Machine Co., located at Bridgeport, Conn., turn out a machine every three minutes, or twenty in a working hour! There are nine hundred men employed, and an invested capital of $1,000,000.

One hundred barrels of crude oil will yield from seventy to eighty barrels of refined, according to the skill of the refiner, and the perfection of machinery employed for such work.

The present rate of wages in the Pennsylvania oil regions is moderate. Drillers and engineers get from $2 to $2 50 per day, and board; mechanics get from $3 to $5.

The manufacture of American flags has been commenced in Lowell. Hitherto such flags have been made of foreign bunting.

The *Herald* of the 6th inst. says, the Government has reduced its coal orders from 10,000 tuns per day to 9,000 tuns per week.

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RIVER COURSES—CANALS—OIL VEINS.

[For the Scientific American]

In a previous article on the oil regions of Pennsylvania, the position was taken that the rivers and creeks had dug their own channels to the depths at which they are now found below the general table lands above, instead of the latter having been individually upheaved, as most persons appear to believe. After having formed this theory by a personal examination of the country, it was some satisfaction to the writer to find this view sustained by such an authority as Professor W. D. Rogers, in his geological report on that State. "The Alleghany River," he observes, "flows through a deep and narrow trench, excavated in the north-western plateau and western coal basin of the State, entering the north-west margin of the coal basin at Warren." Again: "It is evident that while the main discharge of the eroding wave was south-westward, one large influx of eroding waters swept north-westward of the Appalachian Mountains, and another south-eastward from the regions of the lakes." It is to these several agencies that he attributes the remarkable course of that river—now northward into New York, next south-west, then south-east, and finally south-west to Pittsburgh, beyond which the Ohio proceeds north-west, and then westward, before passing out of Pennsylvania. Yet on all this distance the river has never been once deflected from its course by what can be styled a chain of mountains; and the hills are nothing but bluffs through which it has excavated its own channel.

That the entire oil regions, in common with the great Mississippi basin, were upheaved from the ocean bed is a point which admits of no reasonable doubt. As the several layers of sedimentary rocks composing it (nearly all which are absent in New England and Eastern New York and New Jersey) were formed, the sea would appear to have gradually kept sinking to enable the masses of sand to become sand-stone rocks, clays to become shales, peat bogs and forests to become coal beds, gravel beds to become conglomerates, etc. This done, each layer having received its own collections of plants and marine or fresh-water shell-fishes, as the case might be, the whole country was gradually and gently upheaved to its present elevation, the operation being so easy as scarcely to disturb the beds of rocks composing the different strata of the Great West. Traveling along the lines of the Erie and the Pennsylvania Central Railroads, one may observe, on approaching the Alleghanies, synclinal and anti-clinal beds of perhaps ten miles in width, and in places twenty degrees from the horizontal; but along the Alleghany and the Ohio the dip is scarcely perceptible—seldom as much as three or four degrees. The lines of sand-stone and shale are arranged as regularly as the leaves of a book. In the course of more than two hundred miles' travel on foot through the oil region of Pennsylvania, the writer has not been able to observe one violent dislocation in the rocks beyond that produced by huge masses sliding from the summits. He was told, indeed, that such irregularities existed, but failed to find an example. Perhaps to the exception stated should be added the contortions made in the soft shale by huge trees, now petrified, around whose stems of thirty or forty inches diameter the clay had been bent and twisted, so that the horizontal lines were broken.

Before discussing the practical bearings of this subject, it may be proper to explain another feature in the physical formation of the valleys of the Alleghany, Oil Creek, French Creek, etc. In traversing their tortuous courses, which are often loops rather than mere bends, the visitor will observe that the bluffs opposite each convexity are high and precipitous, while the headlands embraced within the curve or concave side of the river slope gradually and gently down to its margin. Illustrations of this may be found every mile or two, and the rule may be set down as general, if not universal. The explanation of that phenomenon is manifestly this: Like every other substance, water has a tendency to move in straight lines. The slight undulations originally existing on the surface of the plateau, together with the agencies alluded to by Professor Rogers, caused the currents to bend this way and that, instead of pursuing a direct course. As the waters were deflected by one elevation, they turned off at an angle, and struck against the next opposing hight, undermining it more or less, and causing its upper series of rocks or clays to fall down to the river bed, in which they were gradualiy dissolved or ground together and carried away. Thus it came to pass that a double action was carried on during the thousands of years or of centuries in which these water-courses were forming. The first was downward, its action gradually decreasing as the channel approached the sea level; the second was outward at the several curves in its course, by striking against the elevated lands, which gradually became bluffs and precipices, in many cases too steep for human foot to climb without the assistance of the hands.

This centrifugal action of the waters, as it may be termed, has kept on for ages, actually increasing the length of the rivers and creeks, whose deep channels invariably lie as close on the outsides of the several curves as the masses of falling debris will permit. Boatmen and raftsmen understand this "law" thoroughly, though failing to comprehend its *rationale*. For in seeking the deepest channel downward or a shallower channel with little current upward, they steer for the concave or convex shore, as the case may be. Travelers on the Potomac, the James, or other rivers in alluvial countries. will have observed that the boat makes no short cuts at bends, having to stand out well from the shallows lying opposite to the various headlands. On the Alleghany these headlands are usually cultivated—in fact, they are the only cultivated soils on the slopes. In some cases, as at Tidioute, villages have been built upon these gentle inclinations.

Now for some of the practical lessons deducible from this explanation of the river-courses of the West. Major-General Butler undertook to force the James into a new channel at Dutch Gap, as Major-General Grant had undertaken with the Mississippi at Vicksburg. Both failed. The current refused to forsake its round-about course and seek the bed of the cut-off, or adopt any other "modern improvement." The trouble lay here: In both cases the river coming down by a pretty straight line struck a bluff a short distance above the upper end of the proposed canal. There the stream was deflected from its course, and struck off at nearly a right angle—one in the direction of another bluff (undermined) known as the Howlett House, the other against that on which Vicksburg stands (also undermined). Had the artificial channels been constructed further inland, or been so bent that their upper termini would have set up against the current of the river, as it struck off toward the opposite shore, there can be no doubt that both projects would have proved successful. In the case of the Dutch Gap work, if it had been located only two hundred yards nearer Bermuda, or if, instead of a straight course, it had adopted the serpentine, its northern entrance opening to receive the waters as they struck the bluff, the James would have rushed through it, and in the course of a few hours removed all obstructions. Yet the possibility of failure, from the cause stated, would seem never to have entered the head of military officer or civil engineer. Neither had studied the philosophy of water-courses.

Once more: There is an impression among men engaged in the oil regions, though not so strong as formerly, that river beds, headlands, bluffs, and table-lands, as such, have something to do with the discovery of oil; that, aside from the veins known to exist beneath the surface, one is more likely to succeed on the east than on the west side; close to the bluffs rather than by the streams; on the bottoms rather than on the plateaus. This is all moonshine. The first discoveries were made in bottom-lands, simply because the oil of the first sand-rocks could more easily force itself to the surface in the valleys than on the hights. As to any other distribution, it is absurd to expect it. At so much greater outlay for drilling, in the first place, and working the machinery afterward, together with the greater risk to seed-bags, tubes, pump fixtures, etc., oil can be obtained as readily on the hights as in the hollows, provided the oil veins are struck. That these are distributed pretty equally throughout what is known as the oil basin, without any reference whatever to upland or lowland, is manifest to all who have studied the physical formation of the country. In the writer's judgment, they have no connection or relation whatever to the coal-beds, which are many hundreds of feet higher geologically; while the structure of the rocks is such that it were impossible for oil, salt water and gas to have percolated downward through one thousand feet of solid rock—a depth to which fresh water is never found to penetrate without artificial channels. If we could even suppose that the oil had first worked its way downward, the gas being formed subsequently, an answer can readily be found in the fact that in the process of distillation the salt water would have become decomposed, and carbonic acid gas, instead of carbureted hydrogen, been evolved from the combination. It there is one truth more than another evident from the oil discoveries, it is that petroleum is as much an older formation than coal as coal is older than wood or peat. To comprehend it aright, we must study it from this point of view.

Correspondence

The Harrison Steam Boiler.

MESSRS. EDITORS:—Referring to your remarks on the Harrison steam boiler, published in your number of April 29th, I wish to say a word in regard to the *strength* of this boiler. In making many experiments to test the bursting strength of the spheres under hydraulic pressure, no sound casting ever gave way under *fifteen hundred pounds* to the square inch; it was not unusual for them to resist *two thousand pounds*, and this, too, when made of iron of no greater strength than the best brands of Scotch pig metal In a practical experience of several years with boilers varying from 5 to 200 horse power, explosions have never happened under any circumstances. Extreme pressure will open its joints before any thing gives way, thus making each joint a safety valve. A cracked sphere may produce a leak, but a boiler under pressure has never been suddenly emptied from such a cause. Instances have once or twice occurred where a cracked sphere has been continued for some time after the fracture was discovered, with no troublesome consequences from the leakage, and no necessity for instant repairs.

There have been but four fractures of spheres in all the boilers mentioned in the advertisement now in your journal, and in every case these could be fairly traced to special causes not connected with pressure. In my experience with this boiler, several have been *burnt*, or, in other words, rendered unfit for service for the moment by overheating after the water had fallen too low. The result in such case is obvious; spheres with no water inside and intense heat outside, are soon heated to redness and warped so much that the integrity of the joints is destroyed, causing the boiler at the injured parts to leak badly, but nothing like an explosion occurs. With great facility and little cost of time or money, the injured parts, in such a case, can be taken out and replaced by new ones, without even the use of highly-skilled workmen, after which the boiler is as good as before the accident. Some of these boilers are working daily at 180 pounds pressure to the square inch; and a good evidence of their value is shown in the fact that several parties, who have used the boiler longest in this country, have already in use, or have sent me orders for, a second one.

With this boiler on our Western steamboats, to which it can be easily adapted, such wholesale destruction of human life as took place on the *Sultana* a few days ago, *cannot possibly occur*.

JOSEPH HARRISON, JR., patentee.

Philadelphia, Pa., May 2, 1865.

Saleratus and the Teeth.

MESSRS. EDITORS:—The ground taken by a recent writer in your journal is not well founded. He asserts that saleratus or soda will dissolve the teeth or render them carious. His experiments do not prove it, though his deductions are true to a certain extent. It is true that a strong alkali will dissolve, or has affinity for, the lower part or root of the tooth, for this part of the tooth, together with lime, is composed of gelatine and albumen, which an alkali will dissolve. But the enamel is composed almost entirely of

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phosphate of lime, with a small portion of earthy matter; therefore I cannot see how he can support his assertions, notwithstanding his experiments. I am satisfied, from a long study of the nature of the teeth, that acid is the only antagonist with which the teeth has to contend. The teeth are never injured by an alkali, except it comes in contact with the lower part (the roots) of the teeth—that part of the tooth usually covered by the gum; and until chemical affinities are changed I cannot be made to believe that an alkali will injure the crown, or that part of the tooth covered by enamel. No sensation is felt by the teeth coming in contact with the strongest alkali, but we receive warning of the injurious effects of acid, however weak, by setting the teeth on edge and producing tenderness.

H. E. SCHOONMAKER, Dentist.

New York, May 1, 1865.

The Best Detergent.

MESSRS. EDITORS:—There is a "washing compound" sold about the country here in which I have invested to the extent of a family right. I want to inquire of you if the component parts are injurious to clothes. It is made of sal soda, borax and lime. Having read the SCIENTIFIC AMERICAN for fourteen years past, I feel that I may be privileged to ask a question. W. C. A.

St. Louis, April 15, 1865.

[Sal soda is the carbonate of soda, and if dissolved and brought in contact with lime, it is decomposed, giving up its carbonic acid to the lime, and leaving caustic soda in solution. Soda has a powerful affinity for grease, and will remove it from cloth, but a strong solution of soda is injurious both to the cloth and to the hands. Borax is a detergent, and therefore would not be wholly useless in this mixture. The best material to be used, however, in washing is good soap. It will remove grease almost as well as caustic soda, it is the best general detergent known, and it is perfectly harmless to the cloth or hands. For full directions for making soap cheaply, see page 183 of our current volume.—EDS.

The Manufacture of French Leather.

The process employed for the tanning of cow hides is similar to that employed in the manufacture of sole leather. Instead, however, of sweating it, hot ashes are rubbed over it, but the mode in which it is prepared in France gives it a far different and better appearance. After the hides have been placed into bark three times, take them out of the vat, cut them with a knife into two parts, from the tail to the head and mark each side at the tail so that they may be easily put together again. Then rinse them in water, spread them on a tree, and strike them out with a blunt iron. If they are not previously well scrubbed, so as to be thoroughly clean, they are at this stage spread on a large tree, and over another hide, and then well grooved with a groove of fish bone. Then spread the halves on a board, with the grain upwards, and grease them slightly with pure terai oil, or linseed oil mixed with a small quantity of tallow. Then hang them across poles, with the grain still upwards, and let them dry thoroughly. After they have become perfectly dry, put them into a tub, and cover them all over with clean spring water. In about an hour take them out for awhile, and then put them in again to remain there over night. They are then taken and rolled upon a strong piece of wood, beginning the rolling from the tail, with the grain inside. By this process of rolling, the claws are all beaten in. Each half makes one roll, which is strongly tied up at both ends. The rolls are now beaten with notched sticks till they attain a very soft touch. In order to perfect the softening, and at the same time to separate the attached bark fluid, crisp well with a piece of wood, and then spread them flat. It is as well to have two persons engaged in this work at the same time, as also in the operation which follows. Now lay each half on a inclined plane, either of wood or marble, which must correspond in length to the whole hide and in width to the half. At first the grain side is put downwards. Have a pail of water near at hand, in which repeatedly dip a scrubbing brush, and rub it until the flesh is quite soft, so that when touched with the finger the mark is quite visible. Then turn the hide with the flesh side to the board, adjusting the back exactly to the edge of the board; press it over with the hand to make it stick to the board, and then rub it with the brush as before. It is now slightly smoothed over with a smoothing iron, in order that formed folds may not remain permanent. First, the back is smoothed, then the down part of the claws. After the folds are perfectly removed, the pressure may be applied with greater force for the removal of the bark pits.

As soon as one-half is smoothed, hang it in the drying loft, and if it is so high as to admit its hanging lengthwise without touching the floor, nail the claws and tail to short, strong pieces of wood, or make slits and put the sticks through, and fix them between two strong poles. But if the loft is low-roofed, then nail the back part to straight, strong poles, hang the poles up, and bind up with strings the tail and claws, so that they cannot hang down and form folds. Should the hides be too much withered by the air, then put each of them on the board, wetting the withered places well upon both sides. Do the same with the other hides, and lay them one upon the other, and pack them all together for a while. Then take the one first wetted again on the board; put the back part upon the edge, and fasten in with some wooden braces. These must be removed after a short time. The hollows caused by the bark and the deposits within them are now pressed out, and the hide is rubbed over with a damp woolen rag, and is again hung up. Before they are completely dry, fit the two halves together, and place them one upon the other, grain to grain, flesh to flesh, till they have formed a pile. Then put some planks upon the top, and a weight. Leave them for 12 hours, and then hang them on poles, cross-ways, till they are dry. After that they may be rolled up, each by itself, or five together, and then bound up with strings.

It must be observed that all the above work must be carefully performed, with the utmost regard to cleanliness. Leather manufactured as above answers all requirements, and in beauty and quality surpasses the Frankfort leather. The French term it *vachen* leather.

Reduction of Government Expenses.

The Government is proceeding vigorously in the work of retrenchment. A number of ships hired on contract have been discharged in Washington, Philadelphia and New York. A large number of sailors have also been discharged. At the Springfield (Mass.) Armory orders have been received by Major Laidly announcing that the daily product of the armory would within ten days or two weeks be decreased to two hundred and fifty guns, thus necessitating the discharge of about nine hundred more men. This will leave between nine and ten hundred, or only one third the number employed when the armory was busiest and turning out nearly or quite one thousand guns per day. No machinists will be discharged, as they will soon be needed on the preparations for the new breech-loader. The fortnight's notice is given the men so that they can have an opportunity to obtain work elsewhere, and all who can are advised by Major Laidly to do so. No further diminution of the working force is apprehended for the present, at least. All the men previously discharged but not fully paid, will be paid to-day up to the day of leaving, as the long-expected funds have arrived from Washington. As soon as the discharged men are paid, payment will begin for February to those remaining. The exact number of muskets in the arsenal is now 333,924.

Major-General Meigs, Quartermaster General, has issued an order requiring all the department officers and agents to forward to headquarters special reports of the number of persons employed, and the quantity and value of the supplies stored at the respective depots, and the means of reduction. They are also required to give an estimate of the stores necessary for a three month's supply, and the disposition recommended to be made of the balance, whether by sale, transfer, or otherwise.

Within a few weeks the Government expenses will probably be reduced to the extent of a million a day. A hundred million of dollars will be paid out to discharged soldiers and sailors during the current month.

It takes two thousand feet of lumber to make a freight car. A well-built platform car is worth $1,000.

Ship-building in Philadelphia.

At the ship-yard of Mr. John W. Lynn, foot of Reed street, a handsomely modelled brig, of 600 tuns, is on the stocks, which will be launched shortly. She is to be called *Henry and Louisa*, and is being built for the firm of Henry Becker & Co., of New York City, and is destined for the West India trade. The vessel will be launched full-rigged, which will be a novelty in these parts. Last season Mr. Lynn built a large steamship for a Baltimore house, and a steamship previously for a New York firm, all showing that the reputation of Philadelphia shipwrights has extended to other cities. Besides the brig there is a large steamship on the stocks of about 1,700 tuns, built for Messrs. E. A. Souder & Co., of this city. This will be about the best steamship ever constructed for commercial purposes at this port. Her length is 250 feet, beam 38, and 26 feet depth of hold. She is destined to trade between New York and New Orleans. It is expected that she will be ready for launching in about two months.—*Ledger.*

[Mr. Lynn is the patentee of a remarkably fine machine for sawing out ship timber, and is in every sense a first-class mechanic. We have had at our office a number of his inventions, all of which are both ingenious and practical.—EDS.

Constitution of Steel.

The *Mining Journal* says:—The Royal Academy of Sciences of Belgium has awarded the gold medal proposed to be given to the author of the best work on the Constitution of Steel to Capt. Caron, so well known for his researches on this subject. M. Stas, the principal of the persons appointed to examine the essays, in commenting on Capt. Caron's work, expresses his own entire concurrence in his opinion, that iron in passing into the condition of steel does not take up any nitrogen in addition to that which it originally contained. Steel, he says, is essentially composed of iron and carbon, and owes its qualities or its defects to two different causes—the state of the carbon in the metal, or the nature of the foreign bodies which debase it. Whenever steel is good its carbon can, under the influence of tempering, combine with the metal, and gives us a hard, brittle metal, which further tempering renders supple and elastic. When steel becomes bad after undergoing several heatings it is due to its carbon having been burnt or separated from the iron, and tempering will not then regenerate the combination. This separation is due to the presence of foreign bodies, more especially silicium. These bodies also give to the metal defects varying with their nature and the impurities they contain.

The Maple-sugar Season in Vermont.

The sugar harvest in Vermont is just ended. The flow of sap was about an average, though greater than that of last season. Sugaring came on early and in earnest—taking most of our sugar-makers unawares. Sap began to flow about the 18th of March, and continued for 12 or 14 days in succession, affording an extraordinary and almost unprecedented run. The most and the best sugar of the season was made during these two weeks. The sugar made is of unusual whiteness, nearly as fair in many instances as the "coffee crushed" of foreign manufacture. This is owing in part to the continued flow of sap for days in succession (nights of course excepted,) thus preventing sourness in the tubs, and to the absence of storms, so that the sap has been free from rain and snow water, either of which very much injures the quality of the sugar.

The sugar season has been "short and sweet," four weeks scarcely intervening from first to last.

THE following should have been published in our issue of May 6th, in connection with the illustration of the "Improved School Settee:"—Three patents have been obtained through the Scientific American Patent Agency on the above articles of school furniture, dated respectively Sept. 29, 1863; Oct. 13, 1863, and Nov. 15, 1864. For further particulars address Jas. Monteith, Washington Hights, New York City, or D. I. Stagg, No. 15 Morton Street, New York City.

WHITEWASH.—Whitewash is not only one of the cheapest and easiest modes of rendering rough woodwork sightly, but is also a capital reflector of light, so that all dark passages, alley-ways, stairs, workshops, etc., are greatly improved by coats of it.

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Breech-loading Rifle.

If the Government does not decide to adopt breech-loading weapons, it will not be for lack of variety to choose from; for, during the last few years, inventors have been active in this field, and very many breech-loaders of different patterns and principles of action are the result.

The gun here shown is of that class provided with magazines from which continuous rounds of ammunitions are forced out by springs or equivalent devices.

Fig. 1

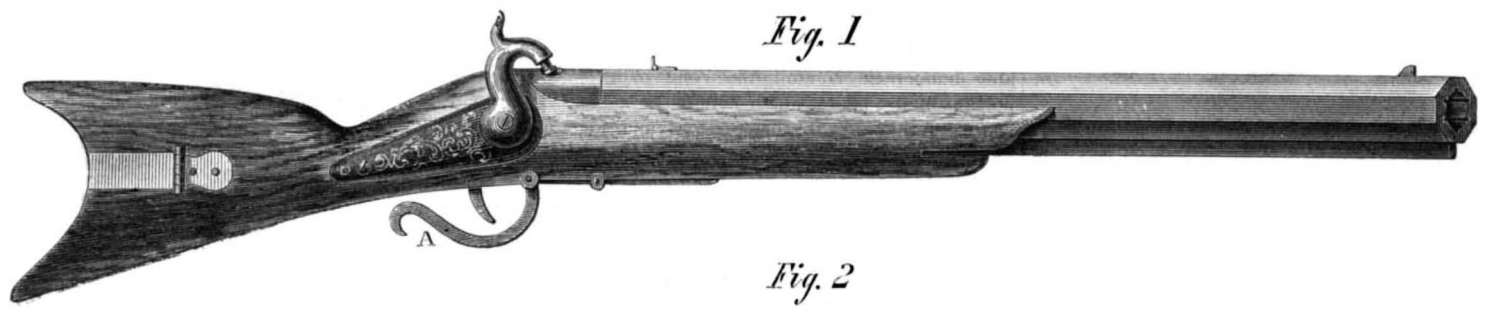
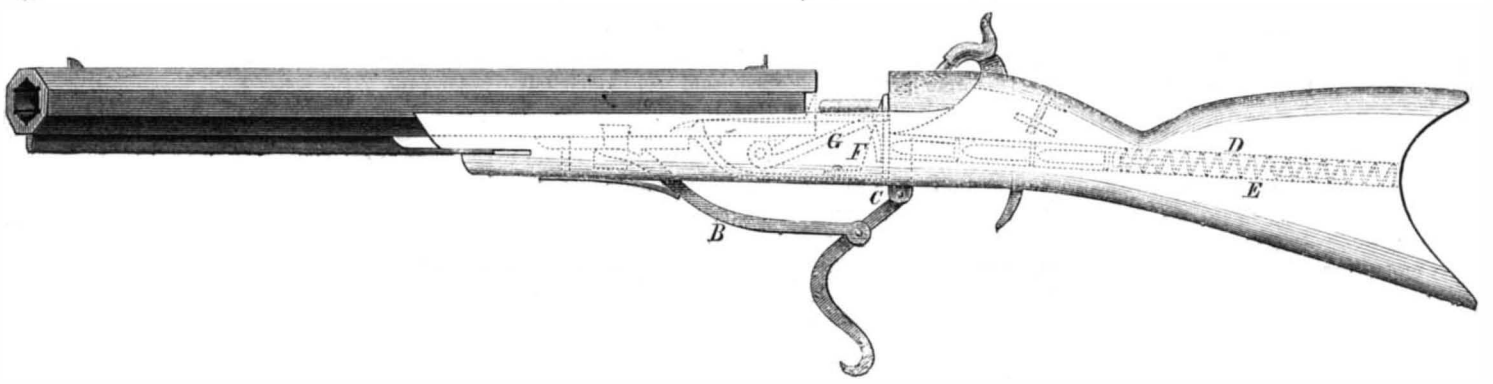


Fig. 2



ROBERTS'S BREECH-LOADING RIFLE.

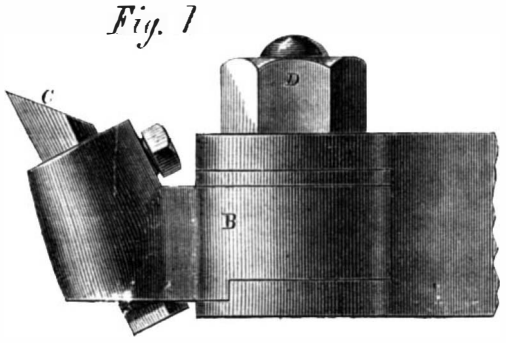
This weapon is peculiar in some details, one being that the barrel is removed from the breech piece in order to insert the charge instead of the reverse, as is generally the case. This action is obtained by working the lever, A, which is connected to the barrel by a bar, B. This bar being fastened to a lug, C, causes the barrel, when the lever, A, is worked, to be thrown forward; when the lever is reversed and brought close up to the under side of the stock, the barrel is firmly held up to the breech pin and magazine, so that no leakage of gas can occur.

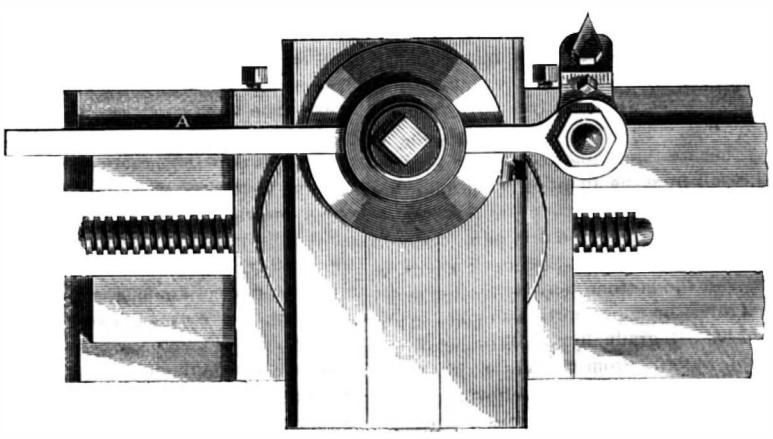
Fig. 2 shows the magazine, D, in dotted lines, as also the spring, E, which forces the cartridges up to the jaw, F; this jaw, in connection with the cam lever, G, guides the cartridges and elevates them to the level of the bore of the weapon. It also serves to expel the empty shell of the cartridge when the charge has been exploded and to prevent the premature issue of the charges from the magazine. These details comprise the whole of the weapon, and it is both simple in design and cheap to construct. The inventor is a soldier in the Army of the Potomac, and his practical experience and observation have guided him in designing this rifle. It can be used with fixed or loose ammunition as emergency requires. It was patented through the Scientific American Patent Agency on the 27th of Dec., 1864, by R. Roberts; for further information address him at Utica, N. Y.

Improved Tool Holder.

Lathemen, who work metals, are well aware that boring tools sometimes require to be made very long —to reach through a pulley, for instance, or a fly-wheel with a deep boss. For such work, a bar is generally provided with a square hole in one end, to which is fitted a short cutter. This bar is not adjustable, except in its length, and the cutter in it can only be used at right angles. The accompanying engravings represent a useful improvement in this class of tools, which adds very much to their efficiency. The change consists in simply furnishing the bar, A, with a short joint, B; this joint is formed into a socket at one end in which the cutter, C, is set and held by the set screw. This arrangement permits the tool to be moved at any angle and there secured, and will save much time in grinding the same, for it frequently happens that more has to be cut off one end of the hole than the other, owing to the draft on the core, so that the tool binds or strikes sideways, unless unusual clearance is given; by running the tool-post carriage back, and setting the cutter on one side, this difficulty is obviated, and the work can proceed. It is also applicable to planers or other machines, and in working around the hubs of rock-shaft arms or cranks, it would be very useful. By tightening the nut, D, the joint can be secured in place. A patent on this tool bar was procured Feb. 21, 1865, through the Scientific American Patent Agency. For further information address the inventor, Chas. Pelet Benoit, Detroit, Mich.

Fig. 1





BENOIT'S TOOL HOLDER.

SECRET PLANS FOR EXTRACTING GOLD.

The writer of this once saw in Marysville, California, a New York baker who had sold out his ovens and wagons in this city to purchase and practically apply a secret process for extracting gold from quartz by melting the rock. He had tried the plan and was describing the result. He had succeeded in melting the quartz, but was astonished at the intense heat required.

"When the rock cooled," he said, "it looked just like glass!"

We remarked that the secret probably consisted in using potash, as glass is made by melting together silex and potash.

But the man, having paid solid money for the secret, did not choose to continue explanations which might lead to its more complete revelation.

At the present time there are a great many men in this city who are dabbling in mining stocks and mining adventures of all sorts. Priding themselves on their keen shrewdness, they are the most fit subjects for sharpers, and are constantly making large losses, which they conceal insilent mortification, while their occasional lucky speculations are sure to be generally made known.

Not long since a quiet individual from the country was mysteriously intimating among these eager speculators that he had a secret for dissolving gold from crushed quartz, in place of extracting it with mercury in the usual manner, by which the yield could be very largely increased. After considerable negotiation, and after showing one of the shrewdest and most cautions of the speculators that the liquid would actually dissolve gold as completely as water will dissolve salt, he sold the secret for $500, cash in hand. It was not long before the lucky purchaser found that he had paid $500 for a receipt for making *agua regia*, a receipt to be found in every hand book of chemistry, which could be purchased for $1.

In nearly every case where a secret is offered for sale it is either something well known to those familiar to the art, or it is a plausible novelty, which for some reason is impracticable and worthless.

COFFEE IN PODS.—An exchange, noticing the fact that coffee had been raised in this State, says, "it was planted in rows similar to peas, and the berry was contained in pods in the same manner." Coffee does not grow in pods, but in berries, of which the kernel, or the pit, as it might be called, is the berry. Coffee on the tree looks much like a cranberry or cherry.

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VOL. XII. NO. 20...|NEW SERIES.|....*Twentieth Year.*

NEW YORK, SATURDAY, MAY 13, 1865.

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PURIFICATION OF LUBRICATING OIL.

Oil for lubricating purposes is very high at the present time, and should be carefully used. Much of it is not only lost by improper use, but is actually thrown away by persons who are too reckless or naturally too wasteful and, regardless of their own property to take any care of that belonging to others. It is a little singular that men who are thought unfit for higher positions are generally made to oil the shafting in factories, where they can waste a gallon every day by slovenly and stupid use of it.

When oil is poured on a bearing, if the shaft be in motion, it takes up a supply enough to cover the surface, while the superfluity runs off at the nearest outlet. If there happens to be a drip pan underneath the hanger, the oil is caught, and when the pan gets full, the contents are summarily thrown out of doors into the nearest waste hole.

Although much of this oil is full of metallic dust, the result of wear, that does not prevent it from being used again when properly treated to remove the foreign matters. This can be done so simply and so easily, that we think much economy to manufacturers will result from the adoption of the following process:—

When the oil is taken from the drip pan, it should be poured off carefully, so that the heaviest part of it, which settles at the bottom, may be treated separately. The lightest or upper portion should be put in a vessel and heated gradually to a little below the boiling point of water. From this vessel it should run through flannel, to filter it, which will remove the finest metallic dust held in suspension by the oil. From this filter the oil will come out semi-transparent, but in a great measure free from the grosser impurities. A filter of *animal* charcoal, or coal made by burning bones, should then be used, which will detain the dirt that still remains behind, and render the oil fit for use again for most purposes.

Oil thus treated will not have the bright and clear appearance of that bought in barrels, but it will be very good, and may be used over and over again with comparatively small waste. Animal charcoal can be had of all wholesale druggists.

For large works, it would be profitable to have a place prepared particularly for the object of purifying the waste oil by the means above described. Other and more complicated processes are employed by refiners to extract impurities from oils, but they are obviously unsuited to persons not acquainted with chemical changes and affinities, and would be useless to our readers. We do not see why it would not be a profitable scheme for those versed in such matters, to collect the waste oil from drip pans and render it pure again for a small sum per gallon. It is not only the spent oil which falls into these drip pans, but that lavishly poured over the hanger by the oiler, so that the contents are very different from common slush. The process above described has been tried on a large scale and is not a mere experiment.

GOOD WILL.

Among the many contrasts between aristocratic and democratic communities, one of the most important in its effect upon human happiness is the great difference in the degree of sympathy between individuals who chance to be in different positions or pursuits.

One of the most impressive pictures in the Dusseldorf gallery was that representing the grinding tyranny in which the poor weavers of Silesia are held by their employers. The famous poet, James Hogg—the "Ettrick Shepherd"—was invited by some of the nobility of England to visit them at their houses, and he said that while, in directly addressing him, they were perfectly polite, he could see, in their talking with each other, that they regarded all those belonging to the non-noble classes as an entirely distinct people—as distinct as the planters in our Southern States regarded their negro slaves. No one can come in contact with any portion of English society without perceiving that it is pervaded with this sentiment of class. The universal feeling is, that persons should be taught to know their place, and that they should not attempt to rise above their position. The desire is quite as strong to keep others down as to get up themselves. This is seen even in their charities, which take the form of alms-giving, and degrade the recipients.

On the other hand, in democratic communities, the general spirit is to give every man a free chance to rise just as high as he can; and even in many cases to give him a friendly lift upward. How uniformly have the great sums, so lavishly given away in this country, been directed to elevate in the scale of humanity the least favored portions of the community! See the wealth of the country everywhere voluntarily burdened with a heavy tax to provide free schools for the children of all. See the Cooper Institute, in this city, with its magnificent reading-room and its admirable lectures, free to all comers. See the Astor Library, the Lawrence Scientific School, and hundreds of similar establishments scattered over the country, all designed to aid the poor and friendless in elevating their nature and position.

Along with this kindly feeling their is one also of mutual respect. Generally the native born American who employs men in his manufactory or his business, looks upon them as fellow citizens, and not as hostile and degraded enemies. He has an instinctive consciousness that the practice of petty tyranny is degrading to the one who practices it, as well as to the one upon whom it is inflicted; and that there is infinite dignity in the observance of manly courtesy towards all with whom he has to deal. There is also a quiet self-respect among workmen, in striking contrast with the extreme severity generally observed abroad.

We have sometimes thought that the rapid growth of wealth, the increasing congregation of people in large cities, and the influence of foreign immigration, both of employers and employed, were tending to build up a hostile class-feeling in this country; but it is probable that these influences are more than counteracted by those of an opposite tendency—that the steady growth of democratic principles, the equality of all men before the law, popular suffrage and free schools, are spreading more and more widely among the millions of our people the spirit of universal good will.

STARCH AND SUGAR.

One of the principal ingredients of grain, seeds, roots and tubers, is starch. It is found more or less in all plants and trees. Nearly four-fifths of the solid part of the bread we eat is starch.

Mix common flour and water; strain through muslin; the milky strained fluid contains starch, which soon settles as a white powder. Rasped potatoes yield starch in the same manner. The substance remaining upon the muslin, after straining, is gluten, which gives cohesion to the flour in bread.

Water does not dissolve starch, but the granules absorb water, causing them to swell and unite into the form of a jelly. It is this swelling of the starch in rice, beans, peas, etc., that causes this enlargement during cooking.

If roasted to a yellowish brown color starch is so changed as to be soluble in water, and is then called dextrine, which is extensively used to thicken colors by calico printers; also by confectioners in making fig paste and other sweet compounds.

To make sugar out of starch heat it hotter than for dextrine; then make it into paste with water; then gradually add a small quantity of water slightly acidulated with sulphuric acid; then boil till transformation is complete, the result being sugar sirup. To remove the acid, add slaked lime, filter, evaporate the sirup, and you have grape sugar. An infusion of malt may be used instead of the dilute acid.

As a sweetener, cane sugar is far superior to grape sugar—1 pound of the former is equal to 2½ pounds of the latter. But the manufacture of grape sugar is so easy that it is extensively used in Europe to adulterate cane sugar.

Grape sugar can be readily made from cotton and linen rags, and also from saw-dust; 5 pounds of poplar wood will yield 4 pounds of grape sugar.

Chemical research indicates that starch and wood ought to be more easily converted into cane sugar than into grape sugar, but no method of making cane sugar from the above substances has yet been discovered. Such a discovery would be of immense value. Here is a grand subject for invention.

SAFES.

English business circles are just now agitated over the success of burglars in breaking into their strong boxes and rifling them of their contents at short notice. The principal agents used by the rogues in effecting an entrance are wedges. These are made of steel drawn down as thin as a knife edge at the point and very slow in taper; a small crevice where the door shuts in is sufficient to enter the wedge, when a few blows of the hammer and the subsequent insertion of stronger wedges forces the crack open so far that a crowbar can be used, and the door is wrenched open in a twinkling.

Simple though it may appear, the construction of safes which are thief and fire proof has involved much thought and kept a great deal of capital employed. The expedients adopted to secure both ends are various and need not be adverted to in detail since the citation of them would be tedious. Chilled iron safes have been proposed and are now in use in many cases, but these, although proof against a drill, are not against a sledge or percussive force of any kind. Steel plates alternately interposed between wrought or chilled iron have also been used, and are good defenses against drilling, for the time required to soften a hardened steel plate, so that a drill would cut it, is too great and too tedious to be undertaken by burglars.

Moreover thieves are not the class of men who are fond of industry, as a rule. If a sufficient reward is set before them they strain every sinew to win it in the shortest time, but with a limited prospect of success not many steel-plate safes will be drilled or softened by a blow pipe, as a foreign contemporary suggests they may be, at the point of attack.

Safes with small balls placed beneath the exterior plates have been invented, the idea being that when the drill penetrates the outer sheet the point striking one of the balls causes the latter to turn so that any penetration is impossible. So far as drilling is concerned there is a possible barrier to it, but a hole once made in the outside affords an entrance for gunpowder, so that in this respect such safes are extremely vulnerable. Besides when a hole is drilled in the outer plate the balls might be taken out.

The principal modes of rifling safes in this country is by this latter method—powder; and as yet we have had but little loss from bursting or prying open safe doors. As ill news travels fast, the success of thieves across the sea, in breaking open safes in the manner previously spoken of, will soon reach members of that ancient but not honorable profession here; we should

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be glad to know that our safes are free from danger in this respect, as inspection of many of them convinces us that a few blows would do the business for them effectually.

THE CIRCUMLOCUTION OFFICE.

The great fiction writers of modern times have become popular not merely by their forcible imaginations and power of description, but by taking some public wrong and making it clear and plain before men, so that the correction comes naturally and necessarily; in so doing they have wrought great good. Charles Read, in his latest work, "Hard Cash," unmasked the iniquities of private mad houses. Thackeray held the mirror up to society; and Dickens, the great master, has rebuked official imbecility and dilatoriness scathingly.

In none of his works is his caustic and vigorous criticism more noticeable than in "Little Dorritt," where he speaks of the Circumlocution Office. Possibly a parallel might be found to it in this country, and many Daniel Doyces among our inventive friends. He says, in relation to the trial of an invention for the Government:—

"Mr. Clennam, will you do me the avor to look at this man? His name is Doyce—Daniel Doyce. You wouldn't suppose this man to be a notorious rascal, would you?"

"I certainly should not." It was really a disconcerting question, with the man there.

"No. You would not. I know you would not. You wouldn't suppose him to be a public offender, would you?"

"No."

"No. But he is. He is a public offender. What has he been guilty of? Murder, manslaughter, arson, forgery, swindling, house-breaking, highway robbery, larceny, conspiracy, fraud? Which should you say now?"

"I should say," returned Arthur Clennam, observing a faint smile in Daniel Doyce's face, "not one of them."

"You are right," said Mr. Meagles. "But he has been ingenious, and he has been trying to turn his ingenuity to his country's service."

[And after the hearing was finally granted, Mr. Dickens says]:—

How, after interminable attendance and correspondence, after infinite impertinences, ignorances, and insults, my lords made a minute, number three thousand four hundred and seventy-two, allowing the culprit to make certain trials of his invention at his own expense. How the trials were made in the presence of a board of six, of whom two ancient members were too blind to see it, two other ancient members were too deaf to hear it, one other ancient member was too lame to get near it, and the final ancient member was too pig-headed to look at it. How there were more years, more impertinences, ignorances and insults. How my lords then made a minute, number five thousand one hundred and three, whereby they resigned the business to the Circumlocution Office. How the Circumlocution Office, in course of time, took up the business as if it were a bran new thing of yesterday, which had never been heard of before; muddled the business, addled the business, tossed the business in a wet blanket. How the impertinences, ignorances, and insults went through the multiplication table. How there was a reference of the invention to three Barnacles and a Stiltstalking, who knew nothing about it; into whose heads nothing could be hammered about it; who got bored about it, and reported physical impossibilities about it. How the Circumlocution Office, in a minute, number eight thousand seven hundred and forty, "saw no reason to reverse the decision at which my lords had arrived." How the Circumlocution Office, being reminded that my lords had arrived at no decision, shelved the business. How there had been a final interview with the head of the Circumlocution Office that very morning, and how the Brazen Head had spoken, and had been, upon the whole, and under all the circumstances, and looking at it from the various points of view, of opinion that one of two courses was to be pursued in respect of the business: that was to say, either to leave it alone for evermore, or to begin it all over again.

"Upon which," said Mr. Meagles, "as a practical man, I then and there, in that presence, took Doyce by the collar, and told him it was plain to me that he was an infamous rascal, and treasonable disturber of the Government peace, and took him away. I brought him out at the office door by the collar, that the very porter might know I was a practical man who appreciated the official estimate of such characters; and here we are!"

DEATH OF DR. MOTT.

Valentine Mott, M.D., LL.D., died at his residence in this city on the 26th of April, in the 80th year of his age. Dr Mott was the most eminent of American surgeons, and his operations have never been surpassed in any part of the world. He was born at Glen Cove, Long Island, on the 20th of August, 1785, being descended from an English family that settled on the island in 1667. After studying medicine in this country he went to England and finished his studies under the tuition of Sir Astley Cooper. In 1809 he commenced the practice of his profession in the city of New York, directing his attention especially to surgery, in which he rose very rapidly to the highest position.

His first great achievement was in 1816, when he successfully performed an amputation at the hip joint. In 1818 he performed the difficult and delicate operation of placing a ligature around the bracheocephalic trunk or arteria innominata, only two inches from the heart, for aneurism of the right subclavian artery. This was the first operation of the kind in history, and the patient lived twenty-six days after. When Sir Astley Cooper heard of this wonderful achievement of his pupil, he remarked:—"I would rather be the author of that one operation than of all I have ever originated." This great triumph has since been imitated only by the first surgeons of the world.

His operation on the great arteries were unparalleled in the annals of surgery. He tied the common carotid forty-six times, the subclavian seven times—every one of them successful; the external iliac seven times—four successful—and the femoral fifty-two times; cut for stone one hundred and sixty-five times, and amputated nearly one thousand limbs. In 1827 he tied the primitive iliac artery. It was the first time this operation was performed in any country, and was perfectly successful. The subject of it, in 1856, was still living, his life then having been extended nearly thirty years. From 1818 to 1824 Dr. Mott performed a variety of original operations on the jaws, both upper and lower, which mark a distinct era in the annals of surgery. On the lower jaw he has performed sixteen capital operations—in four instances removing the bone at its temporo-maxillary articulation. On the 17th of June, 1827, he extirpated the entire clavicle for osteo-sarcoma, which is altogether the most formidable undertaking in surgery. This operation originated with him, and has been performed but twice since—once by Warren, of Boston, and once by Travers, of London. The subject, a distinguished clergyman of the South, was still living a few years before the rebellion.

He was the author of a number of medical works, and had a great many honors conferred upon him by learned societies at home and abroad.

THE MANUFACTURE OF CHEAP JEWELRY.

PROVIDENCE, April 23, 1865.

MESSRS. EDITORS:—Through the politeness of Mr. Steere, of this city, I have had an opportunity of visiting his large manufactory of rings, pins, bracelets, and other ornaments, and purpose in a few words to lay the principal processes before your readers in the clearest manner possible.

MIXING THE METALS.

The first step is to make the proper alloy. In former times the gold was procured by drawing a check on the bank where the proprietor of the works had a deposit, and marking it "gold," when the amount came in double eagles. Now coin is purchased at the current rate of premium, whatever that may be. Two or three hundred dollars of coin is placed in a crucible, with the proper proportion of copper and silver, and melted. Mr. Steere remarked, smiling, that they use no more gold than is necessary, still that they do use some may be inferred from the fact, that a few years since the man employed at his works in melting had abstracted $20,000 of it before the theft was detected.

ROLLING.

The next step is to roll the alloy down to the thickness required for the work. To illustrate this operation, Mr. Steere took a nickel cent from his pocket and presented it to the rollers, but they refused to draw it in till he dipped the edge in spirits of turpentine, thus increasing the friction, when it was instantly drawn through. It was elongated into an oval form, and by repeated passages, the rollers being screwed more closely together each time, it was drawn to a length of six or eight inches in a direction transverse to the rollers, while its width in a line parallel with their axes was hardly increased at all.

STRIKING UP.

The pieces are next cut from the plates of metal, generally by a punching process, and where anchors, crosses or other figures are raised on them, this is done by striking up. A steel die has the figure formed in it by the usual method of die-sinking, and a corresponding figure is raised upon a steel bed or anvil, the upper die being attached to the lower side of a heavy mass of iron which is secured between two vertical slides. The workman raises the heavy mass of iron with the die which is attached to it, lays the bit of thin alloy on the anvil, and lets the upper die fall upon it. The blow presses the thin plate of metal between the dies, imparting to it the figure which is engraved upon them.

When the figure is very much raised, it is impossible to produce it at one blow without breaking the metal. In this case it is necessary to employ two or three pairs of dies, raising the figure partially in the first, and completing it in the last.

SOLDERING.

At a long bench running down one side of the shop, opposite a row of windows, were seated some 20 or 30 high-priced workmen, engaged in putting together the fashioned pieces of metal and finishing the articles. One man was soldering rings. He had about two dozen placed in small slits in a plate, so as to hold them conveniently, with a little solder and borax on the joint to be soldered, and with a blowpipe in his mouth he was directing the tip of the flame upon one ring long enough to melt the solder, when he moved the plate so as to bring another ring under the flame.

FINISHING.

Some of the workmen were soldering stones into breastpins, and others were putting the final polish to the ornaments. After this they were packed in cases and laid away in massive iron safes. Mr. Steere took from one of these safes a lump of gold weighing perhaps four ounces, and stated that it was absolutely pure, having been reduced from the chloride. Its color was the clear yellow characteristic of pure gold.

During the first two years of the war the manufacture of this class of jewelry was almost wholly suspended, but within the last two years the business has been resumed, and large quantities are now being made and sold.

Dickerson's Boiler.

The steam boiler of Mr. E. N. Dickerson, of this city, of which we gave an illustration on page 51 of the SCIENTIFIC AMERICAN, current volume, and on which there has been considerable discussion among engineers, is coming into use rapidly, and, from inquiry, we find that our principal engineering firms and engineers speak of it with great favor. The results obtained by this boiler are remarkable in point of economy and efficiency. It is also so compact in form that a boiler of 10-horse power is but little larger, externally, than a common dry-goods case, while, for accessibility and ease of examination, it is most conveniently arranged.

This boiler does not work on any miraculous principle, but simply brings the water in contact with hot iron, where it ought to be. In other words, by rapid circulation of the contents the heat is not only taken up from the surfaces through which it passes, or impinges against, but the mechanical disengagement of the steam from the water is very much facilitated from the same cause. This latter point is one of importance in the rapid production of vapor. We look upon this boiler as a great improvement in steam generators, and are pleased to know that many of them are now in use and being made; as also to accord Mr. Dickerson the credit of having obtained a result he has so long labored for.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Photographic Picture Holder.—This invention consists in a revolving or movable cylinder or prisma the surface of which is divided off into a large number of parts, each capable of holding a photographic or other picture of that size generally used for photographic picture cards or of any other desirable size, in combination with a movable or stationary case surrounding said movable cylinder and provided with windows corresponding severally in size and position to the several tiers of panels in the cylinder in such a manner that, by revolving or moving said cylinder or case, several rows of pictures, one after the other, can be brought opposite the observer, and a large number of pictures can thus be exhibited in a simple and convenient way. James Bucket, of Harlem, N. Y., is the inventor.

Improvement in Fifes and Flutes—The object of this invention is to produce a fife or flute which is so constructed that it serves to play on two or more keys, This object is effected by the application of a revolving finger piece with one or more sets of finger holes, in combination with a long slot extending through the main barrel, in such a manner that by turning the finger piece different sets of finger holes can be brought into action, and the fife or flute is lengthened or shortened for different keys. The length of the barrel is still further adjusted by the use of an adjustable mouth-piece, which is made to slide up or down on the main barrel, said barrel being provided with an oblong hole, so that, by sliding the mouth-piece up or down, the communication between its mouth-hole and the interior of the barrel is not interrupted. The plug which stops up the end of the barrel close over the mouth hole, is connected to the sliding mouth-piece, so that by adjusting said mouth-piece the plug is also adjusted. A. H. Stratton, 31 Maiden Lane, New York, is the inventor.

Pump for Deep Wells.

We call attention to the pump patented by Kingston Goddard, of Philadelphia, Pa., on the 11th of April, 1865. This pump is said to be very efficient, and appears to utilize, in the best manner possible, a given weight of metal in the production of a pump rod for deep wells. The piston or pump rod is tubular, and is lightened by the removal of portions, leaving openings, which do not materially detract from its efficiency in other respects.

HOW IS IT DONE?—A foreign exchange mentions a magic toy figure of a man which, when on the ground, immediately commences dancing in perfect time to any tune, astonishing all present, and defying detection. It is sold at 6 pence and 1 shilling, English money. They have also a donkey which dances on a similar principle. Inventors on the watch for novelties for the holidays should look into this subject.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on of their funds.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, excepton design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., VII. AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MAY 2, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

47,507.—Churn.—Charles T. Anderson, Clarksburg, Md.:

First, I claim the combination of the rod, C, arm, D, link, G, and handle, H, the parts being so arranged that the motion of the handle will be transmitted to both the bellows and dasher, substantially as set forth.

Second, In a churn of the description herein given, I claim the pin, g, and perforations, d, employed as and for the object specified.

47,508.—Letter Envelope.—James G. Arnold, Worcester, Mass.:

I claim cutting envelope blanks, in the manner and for the purposes substantially as set forth and described.

47,509.—Sick Chair.—Charles H. Bagley, Waltham, Mass.:

I claim the sliding box, B, provided with the lid, H, and hole, G, in connection with the vessel, K, cover, L, slide, I', and the bar, J, provided with the slotted arm. N, all arranged in connection with a case, A, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved sick chair, designed for bed-rooms, and constructed and arranged in such a manner that all unpleasant odor or smell is effectually prevented from escaping therefrom, either while the device is in use or when closed, and the chamber also prevented from emitting any unpleasant odor while being removed from the chair.]

47,510.—Manufacture of Steel.—Julius Baur, Brooklyn, N. Y.:

I claim the above-described process, consisting of combining aluminum with iron in the manufacture of steel, substantially as set forth.

47,511.—Evaporating Pan.—George Bez, Mokena, Ill.:

I claim the combination of fire and steam pans and pipes, as herein set forth and shown, for evaporating sirups.

47,512.—Sofa Bedstead.—Elijah Brady, New York City:

I claim the combination and arrangement of a sofa with the bed and drawer, substantially as described, for the purposes specified.

47,513.—Shoe Lacing.—Mellen Bray, Boston, Mass.:

I claim the employment of staples, arranged in opposite pairs, each pair overlapping or interlocking, in combination with a cord, string or wire, or other such flexible or non-flexible locking device.

47,514.—Corn-planter.—Joseph T. Bryan, Lebanon, Ind.:

I claim, First, The arrangement of the boxes, H H, with their slides, I I, and apertures, d d, the cross pieces, b b, bar, J, lever, K, and tubes in front-shovel-posts, I' P, in combination with the plows, Q Q Q P P, and set piece, F, for hilling.

Second, The attachment of the rods, R R, to the machine, for the purpose of plowing and planting corn.

47,515.—Photographic Picture-holder.—James Buckett, Harlem, N. Y.:

I claim, First, The movable cylinder or prism, A, or its equivalent, containing a series of panels, b, in combination with a movable or stationary case, B, constructed and operating substantially as and for the purpose set forth.

Second, The bay windows applied to the case, B, in the manner and for the purpose substantially as described.

47,516.—Machine for Printing Hats.—Thomas Byrne and Thomas Henry, New York City:

We claim the employment or use of the conical printing roller, F, in combination with a suitable pattern roller, B, of any desirable form or shape, and with a mechanism for supplying color, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use of a conical printing roller, in combination with a suitable pattern roller, to which color is supplied by an endless apron or other mechanism, in such a manner that hats and other articles secured to the conical printing roller, and revolved with it, are brought in contact with the pattern rollers, and continuous stripes or other designs can be produced on said hats or other material, with little loss of time.]

47,517.—Picker Motion for Looms.—John Cady, Staffordsville, Conn.:

First, I claim the stop, L, constructed and fastened to the bed, H, in the manner substantially as above shown.

Second, I also claim making the bed, H, of a concave form, by means of adjustable ends or inclined planes, substantially as described.

Third, I also claim the mode substantially as above described of attaching the picker staff and its strap to each other, and to the shoe, C.

Fourth, I also claim forming longitudinal grooves, o, inclining in the direction shown on the periphery of the part, q, of the box, Q, for the purpose of lubricating its axis, substantially as shown.

Fifth, I also claim the notched flanch, M', of the part, q, of the box, in combination with the key, f, substantially as above described.

Sixth, I also claim arranging the slot, g, in the bed, H, which receives the key, f, so that the box and its axis can be lubricated from above the said bed, substantially as described.

[This invention consists in a novel mode of constructing and operating the devices which guide the motions of the picker staff.]

47,518.—Seeding Machine.—Cyrus C. Carter, Exeter, Ill.:

I claim, First, The adjustable tubes, C, fitted in the turning axle, A, and provided with the funnel, G, in combination with the seed-box, E, provided with the reciprocating slide, H, having the pendant plates, i, attached, and the perforated plates, g h, all arranged to operate as set forth.

Second, The combination of the adjustable tubes, C, turning axle, A, seed-box, E, provided with the slides, f g h, the scattering board, M, and the spring lever, K, and notched bar, L, all arranged substantially as set forth.

[This invention relates to a new and improved machine for sowing seed broadcast and in drills, and it consists in a novel arrangement of parts, whereby it is believed many advantages are obtained over the ordinary machines in use.]

47,519.—Horse Rake.—P. S. Carver, Honeoye Falls, N. Y.:

I claim inclosing the pawls, H I, in the groove, b, of the joint rim, D, by means of the strap, G, in such a manner as to prevent obstruction, said strap also serving to form the joint and retain the parts together, and used in connection with a single handle, E, the whole arranged, combined and operating substantially as and for the purpose herein set forth.

47,520.—Coupling for Thills.—E. D. Clapp, Auburn, N. Y.:

I claim the thill iron, constructed in two parts, and with conical perforated bearings, the said two parts being pivoted together and made to overlap one another under the thill, in combination with the clip iron, constructed and arranged as described, all operating in the manner and for the purpose set forth.

47,521.—Boot and Shoe.—George P. Clark, Brooklyn, N. Y.:

I claim inserting within or attaching to the sole and heel of a boot or shoe, or in and to any desired portion of the same, a series of elastic studs or projections, made of any suitable flexible and elastic material, and of any desired number, size and shape, substantially as described and for the purposes specified.

[This invention consists in fastening within the sole or treading surface of a boot or shoe, a series of projecting elastic india-rubber or gutta-percha studs, the principal object of which is to give an elastic, light and soft-treading surface thereto, as well as to keep the feet warm and dry.]

47,522.—Crank-wrist Connections.—James Clayton, Brooklyn, N. Y.:

First, I claim the combination of the lining pieces, c c, having their exterior sides of sloping form, the independent wedge-shaped side pieces, b b, the screws, d d, and the nuts, e e, substantially as and for the purpose herein set forth.

Second, In combination with the said lining pieces, side pieces, screws and nuts, applied within a cross-head, I claim the guides, a a, provided for the cross-head, substantially as and for the purpose herein described.

47,523.—Ox Yoke.—W. R. Close, Bangor, Maine:

I claim my improved yoke-ring adjusting mechanism, as constructed of the supporting saddle, F, the vibrating hanger, C, its catch block, b, its confining screw and nut or nuts, and the curved rack, D, arranged together and applied to the yoke, in manner and so as to operate therewith, substantially as and for the purpose specified.

47,524.—Awning and Reflector.—Jos. Cordnan, Brooklyn, N. Y.:

I claim the combined awning and reflector, constructed and applied substantially as specified.

47,525.—Chimney Cap.—George W. Demond, Boston, Mass.:

I claim combining with the vanes, e, the blades, f, extending down into the cylinder, and having open spaces between their inner wedges, substantially as herein set forth.

47,526.—Paper Fastener.—Z. W. Denham, Washington, D. C.:

I claim the fastener, A B C, substantially in the manner and for the purposes described.

47,527.—Grinding and Polishing Metals.—Jas. Dodge, Waterford, N. Y.:

First, I claim the method of and machinery apparatus for grinding and polishing spindles, tools, filed blanks and other regular or irregular-shaped articles, substantially as herein described; that is to say, by the employment of two revolving grindstones or polishing wheels, in combination with a mechanism for moving, in accordance with a pattern, the said stones or wheels, or either of them, while revolving to and from each other, substantially as herein set forth.

Second, For grinding and polishing round articles, I claim, in combination with the above causing the said articles, to revolve in contact with the guide stone or polishing wheels, substantially as set forth.

47,528.—Lock Joint for Railroads.—Aaron Douglass, Paterson, N. J.:

I claim the combination of the three laps, A B C, two formed of portions of the base and head of the rail, and one of a portion of the neck thereof, by dividing the rail in vertical and horizontal plains, and offsetting the neck in a lateral direction between the said horizontal planes, substantially in the form and manner herein specified.

47,529.—Kerosene Stove.—Wm. H. Elliot, Plattsburgh, N. Y.:

First, I claim so constructing a lamp with its connecting piece, g, and the lower plate of the stove, that the connection between the lamp and stove may be made by sliding the lamp under the stove substantially as described.

Second, Joining the several rings of said connecting piece together substantially as represented at, g, for the purpose set forth.

47,530.—Oil Pump.—Wm. H. Elliot, Plattsburgh, N. Y.:

First, I claim the main pump, b, applied to the elevation of oil from the well, and the auxiliary pumps, g, applied to the exhaustion of gas or air from a higher position in said well cooperating substantially as described.

Second, The auxiliary pumps, p, arranged in relation to the foregoing substantially as shown and described.

Third, A suction or gas pump, g, and gas separator, f, the one arranged above the surface of the earth and the other below the seed-bag or packing, substantially as described.

Fourth, A reversible suction and force gas pump, g, and lifting pump, b, so arranged in relation to the seed-bag or packing and to the surface of the earth substantially as set forth.

47,531.—Grading Scrapers.—Charles Evans and Wm. C. Bartlett, Morton, Ill.:

We claim the revolving scraper, G, in combination with the stationary mounted frame, A, and lever, E, all arranged substantially as and for the purpose set forth.

We further claim the lever, J, in connection with the wheel, H, or their equivalents, for the purpose specified.

47,532.—Manufacture of Boxes, Packages, Etc.—H. Everett, Philadelphia, Pa.:

I claim the bent strip, D, applied to the formation of the joints of boxes, packages or other vessels, in the manner described, for the purpose specified.

47,533.—Fanning Mill.—Abram Fanckboner, Schoolcraft, Mich.:

I claim, First, The arrangement in relation to each other above described of the double screen, B, the inclined board, P, and the divisions, F and G, of the receiving box, E, when the parts are so constructed as to operate in conjunction with each other as herein set forth.

Second, The construction and arrangement of the receiving box, E, substantially as and for the purpose set forth.

47,534.—Cultivator Plow.—Jas. R. Finley, Delphi, Ind.:

I claim the equal or symmetrical mold boards, when said parts form a continuation of the share, and have the peculiar form and configuration, as set forth and described.

47,535.—Heat Radiator.—Darius G. Fletcher, Racine, Wis.:

I claim, First, The cast-iron ring, c, and arms, d, for supporting the chamber, B, within the case, A, substantially as and for the purpose specified.

Second, The rectangular openings, e f, of the upper register of the chamber, B, for the purpose of facilitating the construction of the device.

Third, The cast-iron ring or cover, E, for the space between the chamber, B, and cylinder, as set forth.

[This invention relates to a new and improved heat radiator for stove pipes, and is an improvement on a similar radiator for which letters patent were granted to this inventor, bearing date April 17, 1860.]

47,536.—Shovel Plow.—C. Ford, Forest City, Ill.:

I claim, First, The mode of making an even-draft two-horse shovel plow, as herein described, with the shafts, F, attached to the frame by the hinges, m and n, and connected by the coupling bar, H, which arrangement, while it holds the shovels evenly, enables the operator to change the face of the shovels at will, and thereby guide the plow.

Second, The false cutters, K, in connection with the braces, I, made to slide in the groove in the head-piece, D, and secured by the clamps,

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J, as herein set forth, in such manner that the operator, by loosing the clamps, J, may change the width between the shovels by sliding the tops of the braces in the groove.

Third, The ring-headed bolt, O, for holding the double trees on the plow, substantially as herein set forth, in such manner that when the plow is thrown on its slide they will balance, remaining parallel to the neck yoke.

47,537.—Window Lock.—F. G. Ford, Washington, D. C.:

I claim the face plate, to which is attached the double right angle slotted tube, the semi-rotating sliding spring bolt, the recessed guiding plate, and the double inclined recessed plate catch, the same being applied and operating in the manner as and for the purposes herein specified.

47,538.—Preparing Hemp, Flax, Etc., for Spinning.—Jim B. Fuller and James P. Upham, Claremont, N. H.:

We claim drawing or separating the vegetable fiber in the manner specified, previous to a carding, picking, or beating operation, for the purposes and as set forth.

We also claim carding the fibers of flax, hemp, etc., in a moist condition, for the purposes specified.

47,539.—Process for Separating the Fibers of Hemp, Flax, Etc.—Jim B. Fuller and James P. Upham, Claremont, N. H. Antedated April 18, 1865:

We claim the mode herein specified of separating vegetable fibers while retained in a suitable vessel, by subjecting such vegetable fiber to the action of steam under pressure, and then to a series of expansions derived from the sudden discharge of steam (but not fiber) from such vessel, as and for the purpose specified.

47,540.—Instrument for Curing Piles.—J. P. Gilbert, M. D., Long Island City, N. Y.:

I claim, First, The cold body, A provided with a nipple, B, constructed and operating substantially as and for the purpose specified.

Second, The grooves, A, in the nipple, B, applied and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use of any cold body provided with a nipple to enter the rectum in such a manner that by said cold body the blood in the tumor is deprived of its superfluous heat and returned to its regular channels. The nipple serves to keep the cold body in its place, and in order to allow the blood to circulate from the tumor, said nipple is provided with grooves near its base. By applying suitable ointment to the nipple, the effect of this instrument can be improved, and the ointment is kept in a box placed in the cold body, which is made hollow for this purpose, and provided with a cover that can be readily removed and replaced.]

47,541.—Mode of Mounting Drills.—Herman Haupt, Cambridge, Mass.:

I claim, First, Mounting drilling, boring, or other like machinery, when arranged for operation by steam, compressed air, or other fluid, upon a columnar frame, whether solid or tubular, and whether steam or other fluid is conveyed to said machinery by independent pipes or through the columns, substantially as set forth.

Second, In combination with the columnar frame for the support of machinery for drilling or boring rocks or other subterranean operations, I claim the pointed set screws, or the equivalent thereof, to brace and steady the said frame, in the manner substantially as set forth.

Third, In combination with columnar frame, which, for the purpose of conveying steam or other fluid, is hollow, I claim the thimbles incasing the set screws to protect the same and prevent leakage, substantially as set forth.

Fourth, The combination of the columnar frame with adjustable supports for the bearings of the trunnions of drills or other like machinery, so as to admit of adjustment of said drills at any hight and at any angle in the plane perpendicular to the axis of the trunnions.

Fifth, Making the supports of a segmental form, and forming the bearing therein adjustable, so as to admit of universal motion of the drills, substantially as set forth.

47,542.—Chair and Cradle.—George W. Hawk, Chicago, Ill.:

First, I claim the combination and arrangement of the two sections, A A, the ends, C C, and the rockers, B B, operating substantially as and for the purposes herein shown and described.

Second, I claim constructing the bottom of the cradle of five parts, D E F G H, when arranged and operating as and for the purposes specified and shown.

47,543.—Die for Cutting Screw Threads.—Benjamin S. Hill, New York City:

I claim the arrangement of the chasing or cutting points of a die or chaser for cutting male screw threads in a line or lines diagonally across the cutting faces or edges, or spiral to the axis, substantially as and for the purpose herein set forth.

47,544.—Explosive Shells.—B. B. Hotchkiss, New York City:

I claim the employment of the webs, B and C, or either of them, arranged to extend from the inner surface of a shell nearly to the center or axis, substantially in the manner and so as to serve the double purposes herein set forth.

47,545.—Tomato Soup.—James H. W. Huckins, Boston, Mass.:

I claim the composition made in manner and of materials substantially as hereinbefore specified.

47,546.—Rotating Stop Cocks.—Daniel Hurd, Chicago, Ill.:

First, I claim the combination and arrangement of the jacket, E, and the barrel, F, provided with the three series of holes, a' a'' and g, operating as and for the purposes specified and shown.

Second, I claim, in combination with the above, the employment of the dial and pointer, arranged as and for the purposes described.

47,547.—Jacks and Mules for Spinning Yarns.—John Goulding, Worcester, Mass.:

First, I claim the combination of a series of prostrate spindles, roller jaws, a movable carriage, and upright guides for the carriage, substantially as set forth.

Second, The combination of a series of prostrate spindles, roller jaws, turning spool support, movable carriage, and upright guides for the carriage, substantially as set forth.

Third, The combination of the rising and descending carriage and roller jaws with upright guides for the carriage and a rack, substantially as set forth.

Fourth, The combination of the rising and descending carriage, roller jaws and turning spool support with upright guides for the carriage and a rack, substantially as set forth.

Fifth, The combination of the rising and descending carriage, the roller jaws and their gearing, with instrumentalities for stopping the revolution of said jaws, when the length of rovings required for one spinning operation has been delivered, substantially as set forth.

Sixth, The combination of the rising and descending carriage, the roller jaws, turning spool support, and the gearing for transmitting motion to roller jaws and turning spool support, with instrumentalities for stopping the revolution of said jaws and spool support, when the length of rovings required for one spinning operation has been unwound and delivered, substantially as set forth.

Seventh, The combination of a series of prostrate spindles with two trains of driving mechanism and with shifting mechanism to put the spindles in connection with one or other train of driving mechanism and disconnect them therefrom, substantially as set forth.

Eighth, The combination of a series of prostrate spindles with a train of mechanism for turning them backwards, and with shifting mechanism to connect and disconnect the spindles therefrom, substantially as set forth.

Ninth, The combination of a series of prostrate spindles and the train of backing-off mechanism, with mechanism for varying the extent of the backing-off movement, substantially as set forth.

Tenth, The combination in a jack of the backing-off mechanism, the faller mechanism and the devices for varying the extent of movement of these two mechanisms substantially as set forth.

Eleventh, The combination of a series of prostrate spindles and the train of driving mechanism for impelling them with varying speed during winding, with mechanism for changing the varying speed substantially as set forth.

Twelfth, The combination of two series of prostrate spindles and their appurtenances arranged back to back with one set of driving mechanism, substantially as set forth.

47,548.—Machinery for Making Screws.—H. A. Harvey, New York City:

First, I claim the combination substantially as described herein of hoppers or receptacles, forwarding ways, delivering apparatus and two setts of conveyors or elevators with shaving, nicking and threading machines whereby headed blocks may be thrown into a hopperand converted into screws without manual labor, as described, the blanks being transferred from one machine to the hopper or receptacle of another by elevators or conveyors operating in the combination substantially as specified.

Second, The combination of a shaving machine and a nicking machine with an elevator and a hopper and its accessories, substantially as described, whereby headed blanks may be converted into nicked blanks, substantially as specified.

Third, The combination of a nicking machine and a threading machine with an elevator and a hopper and its accessories, substantially as described, whereby shaved blanks may be converted into screws substantially as set forth.

Fourth, I claim a pyramidal hopper or receptacle provided with an oscillating agitator constructed and operating substantially as specified.

47,549.—Machinery for Making Screws.—H. A. Harvey, New York City:

I claim. First, The combination substantially as described herein of hoppers or receptacles, forwarding ways, delivering apparatus, and shaving, nicking and threading machines, whereby headed blanks may be thrown into a hopper and converted into screws without manuel labor, the machine operating on the blanks, being arranged on different levels as described, and the blanks descending from one machine to another substantially as set forth.

Second, The combination of a nicking and shaving machine, on different levels, and in working connection with each other by means of apparatus, substantially such as described, the whole arranged and operating substantially as set forth.

Third, I claim the combination of a nicking machine, with a threading machine, on different levels and in working connection with each other, by means of apparatus, substantially such as described, the whole arranged and operating substantially as specified

I also claim arranging, shaving and nicking, also nicking and threading and also shaving, nicking and threading machines, on different levels, in such manner substantially as described, that blanks may be transferred from one machine to another without handling, substantially as set forth.

47,550.—Apparatus for Carbureting Air. Daniel Hurd (assignor to himself, Edwin K. Hurd and Amasa E. Swift, Jr.), Chicago, Ill.:

I claim the peculiar combination and arrangement of the cylindrical vessel, A, the floors, g h i, the peculiar curved vertical partitions, a, and the barriers, c d e f, constructed and operating as and for the purposes specified and shown.

47,551.—Lantern.—John H. Irwin. Chicago, Ill.:

First, I claim dividing the guard of a lantern, in two or more parts by a horizontal section, substantially as and for the purposes herein specified and shown.

Second, I claim connecting the parts of the guard by a hinge upon one side and the catch, F, or its equivalent upon the other, substantially as shown and described.

Third, I claim providing the parts of said guards with the curved projections, a', substantially as and for the purposes specified and shown.

Fourth, I claim the combination and arrangement of the guards, a and b, etc., the rings, c d, substantially as shown and set forth.

47,552.—Toy.—H. C. Ketcham, Bloomfield, N. J.:

I claim the apparatus called the mystic cord constructed and operating as above described, as an improved article of manufacture.

[This invention consists in the construction of a toy called the mystic cord, the cord being concealed in the sides of two or more blocks connected at their lower ends so as to allow their upper ends to pass each other.]

47,553.—Horse Hay Rake.—George W. King, Greenville, N. Y.:

I claim. First, The lever, N, in combination with plate, h, and arm, Y, provided with wheel, C, the whole arranged and operated in the manner substantially as and for the purposes herein set forth.

Second. The lever, D, in combination with lever, E, arranged and operating as and for the purpose herein specified.

47,554.—Coupling Shafts of Boring Tools.—Robert H. Lecky, Allegheny City, Pa.:

I claim the use of the coniformed base, E, and angular groove, R, either separate or combined, when used in connection, with the screw, A, or male part of the socket joints for oil, tools, etc., the nut, B, or female part of the joint being fitted and adapted to the male part. The whole being constructed, arranged and operating substantially in the manner herein described and for the purpose set forth.

47,555.—Coupling Shafts for Boring Tools.—Robert H. Lecky, Allegheny City, Pa.:

I claim constructing the screwthreads of socket joints for oil tools, etc., in the manner substantially herein described and for the purpose set forth.

47,556.—Belt Buckle.—Ferdinand and Charles Lemme, San Francisco, Cal.:

We claim the arrangement of the cross-bar and flange, D and E, with the tongue, F, in combination with the main plate or shield, A B C, when the parts are connected and filled to produce the result substantially as described.

47,557.—Gold Separator.—Wm. H. Long, Mountain City, Colorado Ter.:

First, I claim conveying the product of the battery through the mercury and discharging it beneath the same, by creating a vacuum at the end of the conveying tubes, D' D', substantially as and for the purposes herein specified and shown.

Second, I claim the employment of one or more tubes, D D', arranged and operating substantially as and for the purposes set forth and described.

Third, I claim the combination of one or more air tubes, C C', with the tubes, D D', arranged and operating as and for the purposes shown and set forth.

Fourth, I claim the combination and arrangement of the aprons, S, with the tubes, C' D', as and for the purposes described.

Fifth, I claim the combination of the shaft, F, the funnel, E, tubes, C C' D D', and aprons, S, arranged and operating as and for the purposes described.

47,558.—Pulley Block.—Peter Luck, Williamsburg, N. Y.

I claim the movable side wing or wings applied in combination with the locking pin and with the axle of the sheave or sheaves of a pulley block substantially as and for the purpose set forth.

[This invention consists in the application to a pulley block of one or more movable side wings in combination with a locking pin and hung upon the axle of the sheave or sheaves in the pulley block in such a manner that by withdrawing the locking pin said movable side wing or wings are liberated and free to turn down, and thereby free access is given to the sheave or sheaves in the block. By this arrangement much time is saved in hitching up the rope.]

47,559.—Lunch Box.—John F. Morgan, Boston, Mass.:

I claim a folding box made substantially as herein shown and described either with or without a bottom receptacle.

[This invention principally relates to a peculiar construction of a lunch box whereby when empty it can be folded into a very compact and convenient shape for being carried.]

47,560.—Means for Adjusting the Driving Wheel of Sewing Machines.—Nicholas Niederpruem, Buffalo, N. Y.:

I claim the arrangement of the sliding frame, F, thumb screw, E, and jouanal boxes, e e, in combination with the table top of a sewing machine substantially as and for the purpose herein set forth.

47,561.—Lubricator.—L. H. Olmsted, Newark, N. J.:

I claim a hollow shaft with an aperture or apertures open from the interior to the exterior, said apertures being closed with leather or any other substance that will produce the intended effect, for the purpose set forth.

47,562.—Preparation of Nitrate of Potassa.—H. S. Osborn, Belvidere, N. J.:

I claim the manufacture of nitrate of potassa form the lixivum of wood ashes, in the manner substantially as described.

47,563.—Animal Trap.—George W. Pagett, Adam's Trap, Ind.:

I claim the combination of the catch and head board, thereby holding a poised platform stationary until the treadle is depressed. Also the stationary bait pans in combination with the self adjusting lever treadle, so arranged that the rat must come in contact with the treadle before it is in reach of the bait, consequently the platform falls, leaving the bait untouched.

47,564.—Apparatus for Preparing Peat for Fuel.—Nathaniel F. Potter, Providence, R. I.:

First, I claim the combination of a mill for tempering peat, as described, with a movable carriage, for the purposes specified.

Second the combination of the clutch, H, with the pinions, F F', and the toothed gears, G G', for the purpose of imparting motion to the shaft, B, in either direction as desirable for the purposes specified.

Third, The combination of the endless apron, L, with a cylinder where surface is provided with cells or its equivalents, substantially as described for the purposes specified.

47,565.—Globe Cock.—James Powell, Cincinnati, Ohio:

I claim thecombined valve and valve stem constructed and guided substantially as herein set forth.

47,566.—Stone Gatherer.—J. L. Quinby, Pleasant Grove, Pa. Antedated April 26, 1865:

First, I claim the endless apron, K, in connection with the rotating toothed cylinder, N. and the scoop, L, arranged with the bars, I I, and arms, M M, applied to the mounted frame, A, substantially as and for the purpose herein set forth.

Second, The shaft, H, the bars, I I, arms, M M, and cords, q, in combination with the lever, d, bearing, a, shaft, E, and lever, G, all arranged substantially as shown.

[This invention relates to a new and improved machine for gathering stones from a field and depositing them in a proper receptacle from which they may be readily discharged at the will of the driver.]

47,567.—Cooking Stove.—Lewis Rathbone and William Hailes, Albany, N. Y.:

We claim grating the back plate of a stove so that the draft flue will cause air to circulate through the bed of partially ignited coals from a point near the base to the top thereof, from a chamber in rear of said back plate, in such manner that the refractory particles of coal are caused to burn, substantially as described.

Second, The combination of a front passage, i, a grated back, D, and a cross passage, f, substantially as described.

Third, The combination of the front passage, i, and passages, F F, cross passage f, grated back, D, and draft flue, b, substantially as described.

47,568.—Cultivator.—William Rhodes and Moses Porter, Lovington, Ill. Antedated April 29, 1865

First, We claim the roller, F, mounted upon the tongue, E, and adapted to move simultaneously therewith so as to change the line of draft in the manner and for the purpose herein set forth.

Second, We claim the slot, e, whereby the draft may be shifted at will from the tongue, E, to the roller, F, in the manner and for the purpose described.

47,569.—Apparatus for Heating Buildings.—Hamilton Richardson, Janesville, Wis.:

First, I claim the series of radiating pipes, 1 2 3, etc., arranged in a hot air chamber within the chimney and so provided with cross or connecting pipes and valves that the draft may be varied at pleasure from a direct to an up and down draft substantially as and for the purposes herein set forth.

Second, In combination with the hot air chamber above described, I claim the flues or passages, d and e, constructed and arranged to operate substantially as and for the purpose set forth.

Third, In combination with the hot air chamber above described, I claim the flues or passages, g and h, for the purpose of admitting cold or fresh air from the room or from outside of the building, as herein set forth.

47,570.—Tug Buckle.—Clark D. W. Ries, Edwards, N.Y.:

I claim the combination of the hinged bar, I, with the tongue, K, projecting from the inner bar of the buckle, substantially as described, and for the purpose set forth.

47,571.—Tool for Marking Dice, Etc.—Calvin B. Rogers Deep River, Conn.:

I claim the implement, A, constructed and operated substantially as above described, for the purpose of blacking dice tablets and other articles.

[This invention consists in the construction of an implement for blacking dice and other articles, whereby great facility can be attained in the work, and whereby also the same can be done with greater neatness than has been possible with the implements heretofore used.]

47,572.—Machine for Cutting Ivory.—Calvin B. Rogers. Deep River, Conn.:

First, I claim the cutter, H operated from below the bed upon the under side of the work while it is held upon the bed, substantially as above described.

Second, I also claim the combination in machines for cutting ivory and other substances of a holding rod applied within the kerf of a cutter with a cutter which divides the work from the stuff, and with a drill or centering or marking cutter operated from below the work, substantially as described.

[This invention consists in various improvements in machines for cutting ivory, bone, and similar substances, which enable the workman to cut out his work with perfect edges and with great facility.]

47,573.—Bucket Ear.—Lynford Rowland, Philadelphia, Pa.:

I claim as an improved article of manufacture a bail ear for buckets and other vessels, made substantially as herein shown and described.

[This invention relates to a peculiar construction of bail ears for buckets, etc., whereby they can be set upon the buckets in such a manner as to allow the handle to swing entirely below the top of the same, the advantages of which are manifest.]

47,574.—Harness Buckle.—Cyrus W. Saladee, Putnam, Ohio:

First, I claim constructing a buckle so as to be unbuckled without slackening the strap in the manner described.

Second, The buckle, G, in continuation with the tongue, F.

Third, Pivoting the buckle to the tongue in the manner described.

Fourth, Forming the tongue, F, as a combination of plate, A, in the manner described.

Fifth, The stud, I, or its equivalent, operating as described, in combination with the indentation, V.

47,575.—Lock.—James Sargent and H. W. Covert, Rochester, N. Y.:

We claim a magnet, employed in combination with the mechanism of a lock, in such a manner as to disconnect the action of the dog, or equivalent, that releases the bolt from the operating shaft or key, substantially as herein set forth.

In combination with the magnet, E, we also claim the employment of the armatures, G H, the former having the dog, g, attached, and so operating in relation to the permutation wheels that when the connection of H is broken, that of G will be formed, to allow the dog to enter the notches, substantially as set forth.

In combination with the gate, I, we also claim the shoulders, m and the cam pin, o, arranged and operating substantially as described.

We also claim the tumbler, K, in combination with the armature G, substantially as herein set forth.

We also claim retaining the permutation wheels in place on their bearing, and preventing them from coming in contact with each other, by means of the grooves, J J, and pins, Z Z, or equivalent, substantially as herein set forth.

We also claim the combination of the spring ring, u, and center, w, constituting the permutation wheels, substantially as and for the purpose herein set forth.

47,576.—Machine for Boring Hubs.—Peter Schuttler, Chicago, Ill.:

First, I claim the employment, in combination with a machine designed for boring taper eyes or holes in hubs, of a horizontal

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pivoted bed, C, or its equivalent, substantially in the manner and for the purpose described.

Second, The employment, in combination with a machine designed for boring taper holes or eyes in hubs, of a laterally adjustable carriage, E, and a longitudinally movable carriage, D, and a pivoted bed, C, all constructed, applied and operating substantially as and for the purpose set forth.

Third, The employment of rack and pinion, r p, in combination with a feeding screw, B, and contrivances for throwing this screw into and out of gear with the carriage, D, substantially as described.

Fourth, The vertically sliding half nut, h, toe lever, i, weight, w, shaft, j, and feeding screw, B, in combination with the tool carriage of a hub-boring machine, substantially as described.

Fifth, In combination with the lever, i, and half nut, h, I claim the adjustable stop, H, substantially as described.

Sixth, The boring tool, E, constructed with a cutter, f, spiral flange, and a shoulder cutter, g, substantially as described.

47,577.—Mode of Amalgamating the Precious Metals.—Charles A. Seely, New York City:

I claim the injection of steam or water, or both, at the bottom of the mercury in an amalgamating vessel, substantially as described

47,578.—Steam Gage.—Thomas Shaw, Philadelphia, Pa.:

I claim the employment of a gum tube in the manner specified, or the purpose set forth.

47,579.—Circular Knitting Machine.—Charles Shirtcliff, Philadelphia, Pa.:

I claim the plate, G, and plate, G', with its depressions, d, arranged and operating in respect to the levers, H, of a circular knitting machine, substantially as and for the purpose described.

47,580.—Sleds or Carriages.—Henry Smith, Naubuc, Conn.:

I claim the combination of the lever, segment, gears, h and g, pawl and ratchet wheel, k and l, and creaper wheel, m, with the carriage, substantially as described.

I claim with the above the combination of the guide, n, plate, o, and foot lever, q, with the carriage, substantially as described.

47,581.—Lining for Petroleum Barrels.—Wm. H. Stone, Brooklyn, N. Y.:

I claim the within described process of rendering barrels or other packages impervious to petroleum or other similar liquids, by treating them in the manner substantially as herein set forth.

[This solution consists in furnishing barrels with a lining of pure wax, procured by heating said barrels or packages to 180 or 200 degrees, with a quantity of wax in them, so that the wood will absorb quantity of wax, and the surplus can be readily made to run off, leaving the inner pores of the wood saturated with the wax.]

47,582.—Fifes and Flutes.—A. H. Stratton, New York City:

First, I claim the revolving finger-piece, B, with two or more sets of finger holes, in combination with the main barrel, A, of a flute or fife, constructed and operating substantially as and for the purpose set forth.

Second, The longitudinally adjustable mouth-piece, C, in combination with the main barrel, A, of a flute or fife, constructed and operating substantially as and for the purpose described.

Third, The self-adjusting plug, e, applied to the sliding mouth-piece, C, in the manner and for the purpose substantially as set forth.

47,583.—Apparatus for Shifting Sugar Pans.—Milbern Tibbets, Lancaster, Ind.:

First, I claim, in the described combination with a furnace and railway, the mode of elevating the evaporating pan on to the ways by means of the arms, D d D' d', wheels, E e E' e', levers, F G F' G, and catches, H H', or devices substantially equivalent.

Second, I claim in this connection the removable sections, c and c', arranged and adapted as set forth.

47,584.—Globe Time Piece.—Theodore R. Timby, Saratoga Springs, N. Y.:

I claim attaching the axis of a terrestrial globe to a dial, and revolving both once in twenty-four hours, substantially for the purposes herein specified, with or without an ordinary clock dial.

[This invention consists in attaching the axis of a terrestrial globe to a dial, and revolving both once in twenty-four hours, in such a manner that the globe stands out beyond the front of the clock case, and the effect of the time-piece is materially enhanced, while it serves at the same time to show at a glance the difference of time in places of different longitude, or the difference of the time between any place on the whole globe, and the place where the clock is used, without being compelled to turn the clock round or to look behind the case.]

47,585.—Globe Clock.—Theo. R. Timby, Saratoga Springs, N. Y.:

I claim a globe revolving once in twenty-four hours, in combination with a fixed dial and moving hands, substantially in the manner and for the purpose herein shown and described.

[This invention consists in combining with a globe revolving once in twenty-four hours, under a stationary index, one or more hands, revolving upon a clock dial in such a manner that by said clock dial and revolving hands the local time is indicated in the usual manner, and at the same time the globe and the stationar index affords the means to read off the difference of time in places of different longitude, or the difference of time between any place on the globe and the place where the clock is used.]

47,586.—Timing Explosive Shells by Clock-work.—Frederic Toggenburger, Chicago, Ill.:

First, I claim exploding a bombshell by means of a clock-work applied within said shell, substantially in the manner described.

Second, Providing the clock-work used within a bombshell for exploding the same with a regulating apparatus, by means of which said clock-work can be set to explode the shell at a given time.

Third, Starting the clock-work within a shell, and by which it is to be exploded by the action of the powder charge, which is used in firing the shell from the gun.

Fourth, The combination of the clock-work movement with the rod, M, and the fulminating capsule for exploding the shell, substantially in the manner described.

Fifth, The combination with the clock-work and the exploding device within the shell of the yielding plug, H, by means of which the clock-work is set in motion by the firing of the shell, substantially as herein described.

47,587.—Horse-rake.—H. Tunison, Whitehall Grove, Ill.:

I claim a horse hay-rake, consisting of the body, A, provided with the series of teeth, a a, and provided with the reversible rods, d, or their equivalents, attached separately, as shown, for the purpose of enabling it to be drawn and operated by animals acting independently at each end, substantially as herein shown and described.

47.588.—Lock.—Conrad P. Wagner, New York City:

First, I claim the movable stop, H H, in combination with the longitudinally movable central spindle, F, rotating tumblers, B B' B2 B3 B4, permutation plates, G' G2 G3 G4, and tumbler box, C C*, substantially as and for the purpose herein specified.

Second, The tumbler box, C C*, inclosing the tumblers separately from the other parts of the lock, forming a guide for the bolt, D, and a bearing for the tumblers and their central spindle substantially as herein specified.

Third, The sleeve, M, with one or more slotted flanges or tumblers, M*, and the pin, r, in the yoke, L, or its equivalent, applied in combination with the bolt of the lock and with the spindle, K, substantially as and for the purpose herein specified.

Fourth, The cover, P, for inclosing the permutation plates, secured by means of two or more revolving buttons, Q, and catches, u, substantially as and for the purpose herein specified.

47,589.—Blank for Scythes.—Hervey Waters, Northbridge, Mass.:

I claim the double rod or blank for two, four or more plates, when shaped and arranged substantially as and for the purposes specified

47,590.—Machine for Rolling Metal.—Hervey Waters, Northbridge, Mass.:

I claim a system of grooves for drawing and shaping, substantially as and for the purposes specified.

47,591.—Horizontal Baling Press.—John D. Wilber, Pleasant Plains, N. Y.:

First, I claim the employment or use of two press boxes, placed or arranged in line with each other, in connection with a single follower, operated by four screws, all arranged as herein set forth.

Second, The opening, e, employed in the described combination, with and relation to the follower, D, and slots, c and d, to admit of the introduction of the material into the press boxes, without the use of doors, as explained.

[This invention relates to a new and improved baling press, of that class in which two horizontal press boxes are employed, in order that the material to be compressed and baled may be placed in one press box, while the material which was previously placed in the other press box is being compressed within it.]

47,592.—Ox Yoke.—Erastus S. Woodford, Winsted, Conn.:

I claim the spirally grooved rod, D, by which their simultaneous movement is directed, thus adjusting the length of bow by which each ox works.

47,593.—Seed Planter.—Lum Woodruff, Ann Arbor, Mich.:

First, I claim the conical dropping tube, A, consisting of the cone, a a, with the partitions, b b, separating the space between the cone, a a, and its concentric outer covering, A, into several grooves or channels, for the more effectual scattering of the seed, the whole being constructed and arranged substantially in the manner and for the purpose above specified

Second, I claim the arrangement of the small triangular drag, B B, with the teeth, t t, when placed on each side and in front of the furrow tooth, d, and the covering teeth, e e, substantially in the manner and for the purposes set forth in the above specification.

Third, I claim the adjustable cross bar or gage, c, when movably attached behind the teeth, e e, so that it may be raised or lowered to control the depth of working of the teeth, e e, as described in the specification.

47,594.—Spring Bedstead.—Wm. Woods and E. Smith, Worcester, Mass.:

We claim the combination of the two sets of springs, intervening cross bars and sockets, when constructed and operating in the manner and for the purpose of giving ease and buoyancy to the slats, substantially as described.

47,595.—Chain for Water Elevators.—Philander Anderson (assignor to himself and P. K. Bronson), East Avon, N. Y.:

I claim as an improved article of manufacture, the malleable iron square, or flat link chain, the links and swivel being constructed and connected in the manner shown and for the purposes specified.

47,596.—Grain Dryer.—Lewis S. Chichester (assignor to himself and Clark W. Mills), Brooklyn, N. Y. Antedated April 15, 1865:

I claim, First, The combination with a drying or cooling apparatus for grain, of two or more elevators, substantialy as specified, so that the grain can be passed through the drying apparatus, and again elevated and delivered, or elevated and delivered at once, substantially as specified.

Second, I claim a series of flat drying tables for grain, inclined in alternate opposite directions, and receiving the grain from the bottom of one set of tables upon the apex of the tables below, substantially as specified.

Third, I claim the combination of the series of tables, o p, inclined in alternate opposite directions with the hollow walls, q t, forming the inlets and outlets of the air, as set forth.

47,597.—Hanging Circular Saws.—W. R. Close (assignor to himself and G. W. Merrell), Bangor, Maine:

I claim as my improvement or invention, for centering a circular saw, or applying it to its arbor, the combination described, the same consisting of the head, b, the screw, c, the nut, C, and the hub, B, with its screw, f, and the shoulder, h, such nut, C, and hub, B, being provided with the recess, i, and the polygonal head, k, or the irequivalents, and the whole being arranged substantially as specified.

47,598.—Pulley Block.—Robert P. Fuller, Machias, Maine, assignor to Henry Richmond, San Francisco, Cal.:

I claim the combination of the grooved cheeks, A A, strips, C C, metallic strap, a a b b', and hook, D, all constructed and arranged as and for the purpose herein specified.

[The object of this invention is to construct ships' blocks in such a manner that the cheeks of the same will be prevented from splitting, and to this end the cheeks are arranged with the grain of the wood, at right angles with the metallic strap which encompasses the block, the strap being fitted in grooves in the cheeks, so that the outer surfaces of the former will be flush with the outer surfaces of the latter.]

47,599.—Borer for Wells.—Thomas J. Lovegrove (assignor to himself and Henry Raldwin, Jr.), Philadelphia, Pa.:

I claim, First, A drill, with two or more cutting edges, sloped from toe to heel, at an angle to its line of vibration, substantially in the manner described, for the purpose of boring a hole of larger diameter than the drill, as set forth.

Second, The combination with the drill of the inclined wings or flanges, E E', substantially as described, for the purposes of turning the drill automatically, and of smoothing and rounding the hole, as set forth,

Third, A tubular jar, so constructed as to serve as a pump for removing detritus from the well.

Fourth, A cylinder containing a chamber which serves the double purpose of an air cylinder and a detritus chamber

Fifth, The combination of a tubular jar and a sand pump, in such manner that one of the tubes of the jar shall form the induction pipe of the sand chamber.

Sixth, The combination in an instrument for boring wells, of a hollow drill and a tubular jar.

Seventh, The combination of a hollow drill, a tubular jar, a sand pump, and a flexible hose or discharge pipe.

Eighth, The combination with a drill of flanges, E E', to turn it, and ratchets, d d', to prevent its backward movement, substantially as described.

47,600.—Borer for Wells.—T. J. Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim, First, Rotating a boring tool by hydraulic pressure, substantially in the manner described.

Second, The combination with a drill of a tubular jar, rotated by the fluid passing through it, substantially as described.

Third, The combination with a tubular jar, rotated in one direction by hydraulic pressure of a ratchet or other detent, to prevent its rotation in the opposite direction, substantially as described.

Fourth, The combination of a rotating drill with a discharge pipe with a swiveling joint, substantially in the manner described, for the purpose of rotating the drill without twisting the pipe, as set forth.

Fifth, Suspending and vibrating a rock drill by two ropes, substantially in the manner described, for the purpose of rotating the drill by the reacting twist of the ropes, as set forth.

Sixth, The combination of an automatically revolving drill, with an automatically rotating jar, substantially as and for the purpose set forth.

47,601.—Rock Drill.—T. J. Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim a rock drill, perforated from its face to its head, and having cutting edges around the perforation, in combination with a valve, substantially as described, for the purpose of removing the detritus through the drill.

Second, A drill having part of its cutting surface radial to its center, and at right angle to its line of vibration, and the other part sloped downward from hull to toe, at an obtuse angle to its line of vibration, substantially in the manner described, for the purpose of cutting a hole of a diameter greater than that of the drill, as set forth.

Third, A drill having two or more cutting surfaces on one side, and a single cutting surface in a higher plane on the other, substantially as described, for the purpose of cutting a core with the polygonal surfaces to be removed by the single cutter.

Fourth, A drill having cutting edges on different planes, the one horizontal and the other at an obtuse angle thereto, substantially as described.

Fifth, The combination with a drill, having its cutting edges in different horizontal planes, of the wings or flanges for rotating the drill, substantially as described.

47,602.—Machinery for Forming Baskets.—John W. Millet, Bachelorsville, N. Y., assignor to Benjamin R. Jenkins and Cyrus Sumner, Edinburgh, N. Y.:

First, I claim the conical drum, F, provided with the channels or grooves, f f f f, and alternate projections, g g g g, in combination with the chuck, G, and flange plate, L, substantially as shown.

Second, I claim the follower, M, in the movable rest pressed against the movable drum by means of weights in the manner described.

Third, I claim the vibrating lever, R, and the guide spring, T, substantially and for the purpose specified.

47,603.—Device for Securing Grain Bands.—John Nelson (assignor to himself and Wales Needham), Rockford, Ill.:

I claim securing the ends of the twine or cord bands used for binding sheaves of grain by means of metallic clamps, applied in the manner, without any knotting of the band in fastening, as hereinbefore set forth.

47,604.—Machine for Cleansing, Dressing, and Cutting Flax, Etc.—Ezekiel Phillips, Blackstone, Mass., assignor to himself and Daniel B. Pond, Woonsocket, R. I.:

I claim the combination or machine as consisting not only of the intermittent feeding mechanism, and the movable knife or mechanism for cutting off the fibers, in manner as described, but a stationary grid or grating (arranged in the case as set forth) and a rotary beater, so arranged as not only to operate with the knife and cause it to cut off the flax or fibrous material, as explained, but to beat and comb or dress it, and subsequently discharge it from the machine, substantially as specified.

And furthermore I claim for use in this particular class of machines the sectional driving gear, l, as made not only with an arc of teeth, but with an auxiliary tooth, supported by a spring, arranged with respect to such arc substantially in manner and for the purpose as hereinbefore explained.

47,605.—Machine for Cutting Nails.—Edwin Reynolds, Mansfield, Conn., assignor to himself and Benjamin Gage, Boston, Mass.:

I claim as my improvement in nail-cutting machines their organization with two pairs of cutter heads, each one of which carries two or more cutters, the whole being so arranged as to operate across the entire width of a sheet of metal, to cut from the end thereof, simultaneously, two or more nails, without giving to the nail plate any other movement than its progression or feed

47,606.—Manufacture of Metal Boxes.—Wm. T. Slocum (assignor to James S. Mason & Co.), Philadelphia, Pa.:

I claim connecting together the ends of a strip, A, by inserting the lips, a a', at one end of the strip through the slots, e e', at the opposite end, and bending them down against the inner side of the slotted end, when the said lips and slots are formed substantially as described.

47,607.—Pneumatic Churns.—Abbie J. Smith, Litchfield, Conn., Administratrix of the Estate of Andrew P. Smith, deceased.

I claim, First, The double-action bellows, operated by a crank and pitman from the driving shaft, the vertical rotating hollow shaft having holes in its lower bearing to receive the wind from the bellows and distribute it in the cream, in the manner herein described.

Second, I claim the valve, i i, in the recess, n, and the air chamber, g, in combination with the induction holes, o o, in the bearing of the hollow shaft, F, for the purposes set forth.

Third, I claim the horizontal air tube, I, with its openings, n n, in combination with the beaters, m m, operating in the manner herein described for the purposes specified.

REISSUES.

1,943.—Magazine or Self-loading Fire-arm.—G. W. Hughes, Bloomington, Ill. Patented Nov. 15, 1864:

First, I claim pivoting the rolling breech-piece, C, upon the circular head of the lever bar, as shown and described.

Second, I claim the sliding breech block, D, when constructed with the flange, having an opening for the hammer to strike through, and operating in connection with block, e, as herein set forth.

Third, I claim pivoting the lever guard, b, breech-piece, C, hammer, E, and the independent cocking device, all upon a single bolt, as substantially shown and described.

Fourth, I claim the retractors, g g, when constructed and operating as set forth.

Fifth, I claim the use in a magazine gun of a chain, constructed and operating substantially as set forth.

Sixth, I claim the plate, G, or its equivalent, constructed and operating as and for the purpose herein set forth.

Seventh, I claim the independent cocking device, when constructed and operating as shown and described.

Eighth, I claim dividing the rear portion of the stock longitudinally and horizontally, for the purpose of constructing a magazine therein, and obtaining access to the same, substantially as and for the purpose herein set forth.

1,944.—Feathering Paddle Wheel.—Manley Paddle Wheel Company, New York City. Patented June 24, 1862:

We claim the combination and arrangement of the paddle of a feathering paddle wheel, with its rock shaft, and the frame work of the paddle wheel, in such manner that the center of the paddle is situated in such position that the pressure at the end of the paddle adjacent to the feathering mechanism is divided equally, or substantially so, between the adjacent side frame of the paddle wheel and the frame of the feathering mechanism, substantially as set forth.

1,945.—Mode of Preparing Concentrated Food.—John H. Schenck, St. Louis, Mo. Patented Nov. 22, 1864. Antedated July 15, 1863:

First, I claim the process herein described of preparing, cooking, dessicating and pressing concentrated food, substantially as set forth.

Second, I claim as a new article of food the compound herein described, namely, a compound of corn, oats and barley, when cooked by steam or otherwise, dessicated, and pressed or unpressed.

1,946.—Barrel Machinery.—Wm. Trapp, Jr., Elmira, N. Y. Patented Oct. 1, 1845. Reissued March 10, 1849, and extended:

I claim, First, The combination of the slide rest, k, guided in the manner set forth with the tool, L, for turning off the cask, constructed and arranged in the manner set forth.

Second, The combination of the cylinder, E, open at both ends, so that both ends of the cask may be worked off without changing with the ring chucks, O, for fastening the cask into the cylinder, and with the tools herein described for chamfering and howeling.

Third, The crozing tool, V, with the changeable face plate, w, as herein set forth.

Fourth, The combination of the stock, l, cutter, P, made adjustable, and the gauge plate, l2, constituting the tool for turning and smoothing the outside of the cask, as above described and represented.

Fifth, I likewise claim the peculiar construction of the tool for howeling the cask, substantially as described.

Sixth, Also, the peculiar construction of the tool for chamfering the end of the barrel, as above described.

1,947.—Barrel Machinery.—Wm. Trapp, Jr., Elmira, N. Y. Patented Oct. 1, 1845. Reissued March 10, 1849, and extended:

First, In barrel machinery I claim jointing the edges of staves, substantially in the manner above described.

Second, In machinery for beveling the edges of staves of varying widths while bent into the proper bilge form, I claim providing for retaining the plane of cut in the same position relative to the stave that a radial plane passing through the imaginary axis of the cask and the beveled edge of the stave will occupy when the cask is completed, substantially in the manner described

Third, In barrel machinery I claim the jointing of a stave of the proper bevel and shape by a straight jointer, while the stave is so bent that the joint, when it shall be placed in the cask, will be in a radial plane passing through the axis of the cask, substantially in the manner above shown.

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PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have act ed as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesmant Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

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Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

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Every applicant for a patent must furnish a model of his invention is susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

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Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

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Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'s Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

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Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

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UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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Notes and Queries

D. P. K., of Ohio.—It may be that petroleum has been transported from one place to another in the form of vapor, after being evaporated by the internal heat of the earth, but that it was formed from oxygen, hydrogen and carbon vapors is improbable, from the fact that there is no oxygen in its composition. It is composed of hydrogen and carbon, but these two elements do not combine by simple contact, and it is in the highest degree probable that their combination in petroleum was first effected by animal or vegetable growth.

W. F. R., of Ind.—Augurs for boring port-holes are in common use. If you have any novelty in that line, doubtless a patent can be obtained.

R. H., of Pa.—The book you require is the "Practical Draughtsman." H. C Baird, No. 406 Walnut street, Philadelphia, is the publisher.

E. M., of Mass.—The cheapest varnish in the present state of the market is copal—made by dissolving copal gum in linseed oil.

A. M. P., of Conn.—A good hydraulic ram will raise water to any hight, but the greater the hight the smaller the proportion of water which can be raised. This correspondent wishes the address of some manufacturer of hydraulic rams. Direct to A. M. Perkins, West Winsted, Conn.

J. B., of Ill.—Steel is hardened by heating it a bright cherry red, and plunging it in cold water; its temper is then drawn by warming it over a charcoal fire. Weights to balance each other on a lever must be in inverse proportion to their distance from the fulcrum.

P. Z. J., of Mich.—There are several patents for gumming machines; for the address of patentees see back numbers of the SCIENTIFIC AMERICAN.

N. H., of Ill.—You had better write to H. C. Baird, of Philadelphia, for a treatise on optics.

G. W. S., of Md.—Scotch whetstone is used in polishing scagliola. It is also polished with tripoli, charcoal and a piece of fine linen, afterwards with a piece of felt dipped in tripoli, and finished with pure oil laid on with cotton.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable

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Improved Mist Forge.

All persons who have watched a blacksmitb. at his work must have noticed that he occasionally throws water on the fire. By a singular contradiction, when he wishes to increase the heat he throws on cold water. The object of this proceeding is gained in a different way from that generally supposed; the heat is augmented by preventing radiation, not by the decomposition of the water, and adding the resultant gases, oxygen and hydrogen, to the products of combustion. This check, for the time, increases the heat very rapidly and is attended with corresponding gain of time.

The forge here shown is intended to apply the water itself at any time at the will of the blacksmith, and is constructed with a water back, A, as usual, and additionally a tank, B. There are pipes in this tank at the top and bottom, as at C, the latter being in communication with the sprinkler, D. The lower pipe enters through the opening, E, in the water back, and the upper pipe, F, enters the other opening. If there is a pressure of steam in the water back, the water in *it* enters the bottom of the tank, B, and forces water up through the pipe, C, from whence it runs into the sprinkler over the hearth, when the cock, which the handle, G, communicates with, is opened. Thus the water can be thrown on at will by opening or shutting the communication between it and the tank, and in greater or less quantities, according to the work to be done and the heat to be taken. A common water tuyere, or "tweer," as generally called, is shown at H; the blast enters this through the orifice, I, Fig. 2, and the front of it is kept cool by the additional pipe, J, which allows a few drops to trickle down on it, and prevent it from burning out. This auxiliary sprinkler is to be used with the common tweer only, not with the water tweer, where it is not required. Fig. 2 shows the tank, K, used in connection with this common tweer, and the mode of attaching it to the forge back. When not in use it can be laid on one side.

The inventor asserts that the use of this arrangement, by its regular and steady action, causes a saving of fuel, and that the "heat" on the iron is taken in one-third less time than with a common forge. It can also be used without charring the coal, and the fine dust and small cinders which are forced by the blast over every thing in the vicinity of the fire, or else carried up the flues and out on the roof of the building, are entirely confined by the use of this sprinkler, rendering the business much healthier and the shop more agreeable to work in. A patent on this forge was procured through the Scientific American Patent Agency on the 14th of March, 1865, by J. H. Gould, of Cincinnati, Ohio; for further information address him at that place, Box 2,445.

Fig. 2.

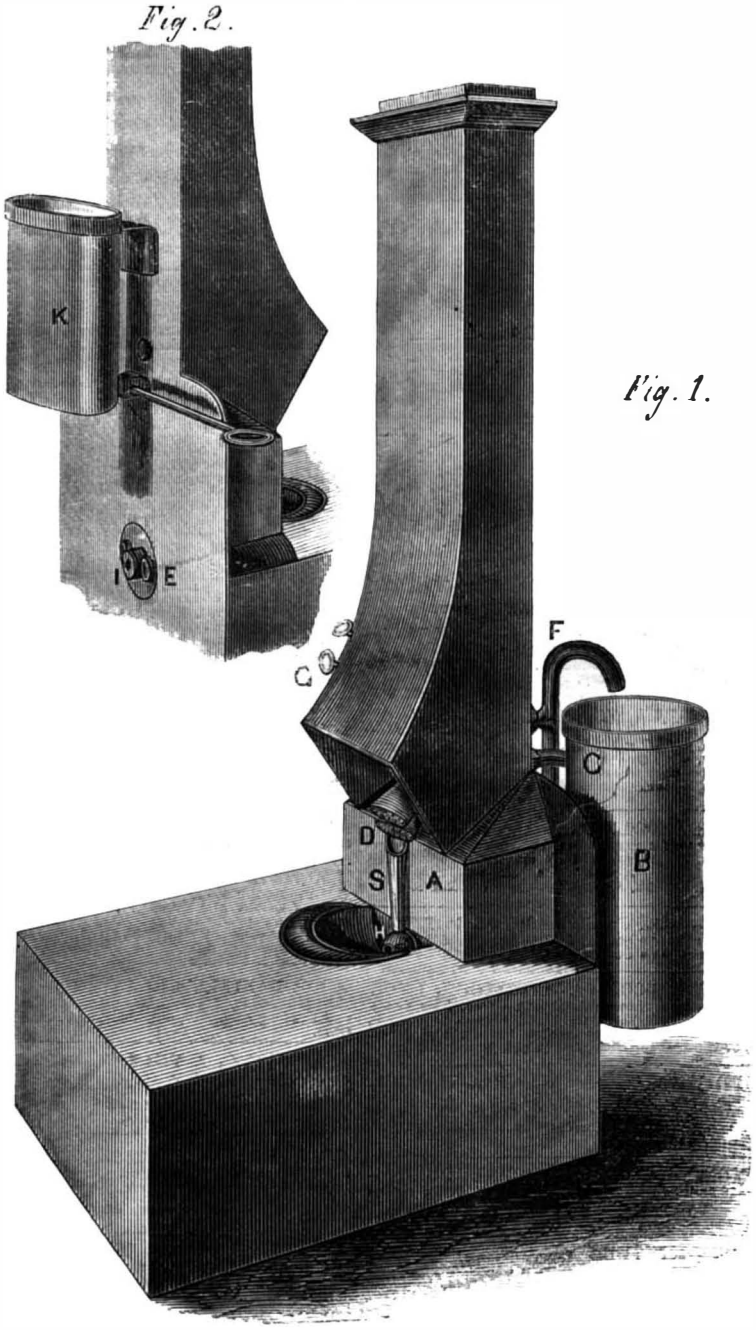

Fig. 1.

GOULD'S MIST FORGE.

A Coal-wheeling Stoic.—A boiler explosion took place recently in the Missouri Iron Mills, Wheeling, while an old man named Whitmore was engaged wheeling in coal. The boiler passed close beside him, but he went on with the regularity of a pendulum, back and forward with his barrow loads of coal. The next day he assisted in clearing up the wreck. Since then the old man has died, and it was found that his legs were so severely scalded as to cause his death.

The First Iron Ship.

According to the Worcester (Eng.) *Advertiser*, Mr. John Wilkinson was the inventor and original builder of iron ships. The authority for this statement is an old letter found by his descendants. One of them thus speaks of it:—"This letter is dated Broseley, July 14, 1787, and the following is an extract:—'Yesterday week my iron boat was launched; it answers all my expectations, and has convinced the unbelievers, who were 999 in 1000. It will be a nine days' wonder, and then be like Columbus's egg.' The letter is signed 'John Wilkinson.' In another part of the same letter John Wilkinson says:—'My coinage I expect will be out shortly,' and accordingly it did appear in 1790, as evidenced by coins still existing, on the field of the reverse of which is pictured the iron ship alluded to. Now, I think it will be perceived frem what has been stated above, that John Wilkinson, of Broseley, in Shropshire, and Castlehead, in Cartmel, Lancashire, and not Mr. Ramsden, was the inventor of iron ship-building. This vessel was built at Willey, in Shropshire, and afterwards traded between several ports in the Severn."

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